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PORTABLE STORAGE CONTAINER

Abstract:

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A portable storage container (10) that both stacks and nests with similar containers includes a plurality of walls (14, 16) extending upwardly from a floor. At least one bail member (18) is moveable between a plurality of positions for supporting the similar containers at varying heights. The bail member (12) is moveable between a low nest position and a high nest position. In the low nest position, minimal clearance between the floors of the stacked containers is provided, and the stacked containers have the lowest overall height. In the high nest position, a ledge protruding outwardly from an outer surface of a wall of the up e69 per container is supported on a support portion of the bail arm (21). Data supplied from the esp@cenet database - Worldwide

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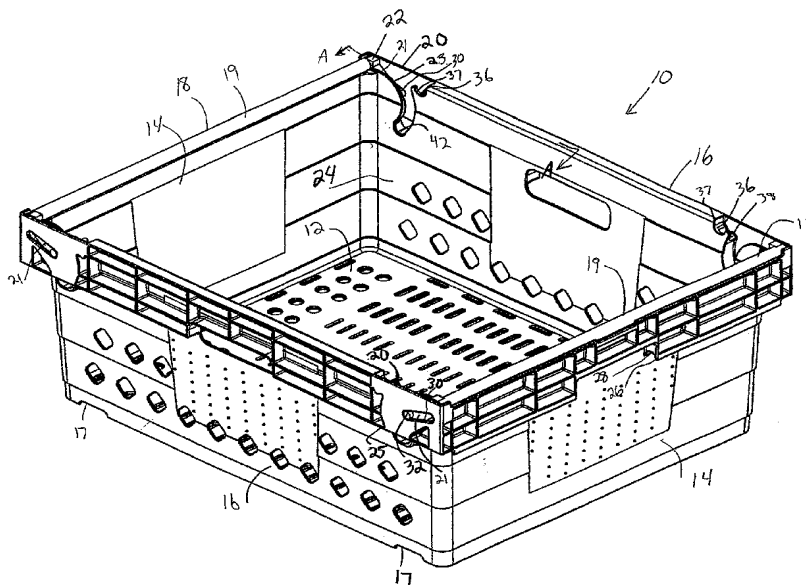
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(57) Abstract: A portable storage container (10) that both stacks and nests with similar containers includes a plurality of walls (14, 16) extending upwardly from a floor. At least one bail member (18) is moveable between a plurality of positions for supporting the similar containers at varying heights. The bail member (12) is moveable between a low nest position and a high nest position. In the low nest position, minimal clearance between the floors of the stacked containers is provided, and the stacked containers have the lowest overall height. In the high nest position, a ledge protruding outwardly from an outer surface of a wall of the upper container is supported on a support portion of the bail arm (21).

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## PORTABLE STORAGE CONTAINER

### BACKGROUND OF THE INVENTION

The present invention relates generally to portable storage containers and  
5 more particularly to portable storage containers that provide the ability to select different nesting and stacking depths.

Portable storage containers that both stack and nest with similar containers are commonly used for transporting and storing goods. Nesting is typically achieved when an empty container receives a like container therein such that there is at least  
10 some overlap between the walls of the containers. The stacking feature is typically used when an occupied container has a like container supported thereon, such that the goods contained in the lower container are preferably not contacted or damaged by the upper container. Many containers use members known bail members to achieve the stacking feature. Bail members may typically be positioned out of the  
15 way for purposes of nesting, but then moved to a stacking position for allowing containers to be stacked thereon.

The bail members in some containers are movable among three positions: a nesting position, a first stack position and a second stack position. In the nesting position, the bail members are out of the way and the upper container can  
20 substantially nest within the lower container. The bail members support containers in the first stack position at a first distance from the floor, where the upper container is not substantially nested within the lower container. The bail members also can be moved to the second stack position to support the upper container at a second distance from the floor, where the upper container is partially nested within the  
25 lower container.

The depth at which the bail members can support a container stacked thereon is limited because structure for supporting the bail member must be provided and the structure must still be able to nest with a container nested thereon. Providing bail members that extend substantially below the top band of the container can diminish  
30 stability and structural integrity. Additionally, the longer the arms of the bail member are, the more likely they are to become misaligned.

## SUMMARY OF THE INVENTION

A container according to one embodiment of the present invention provides a low nest position and a high nest position for the bail members. In the low nest position, a container stacked thereon will nest into the container significantly, thereby minimizing the total space occupied by the two containers, while still providing a minimal clearance between the floors of the two containers for short goods stored in the lower container.

In the high nest position, a little more storage space is provided between the floors of the stacked/nested containers, such that larger goods can be stored in the lower container without contact from the upper container. In the high nest position, the bail member is oriented such that a support portion of the bail member spaced upwardly from uppermost edges of the walls. The bail member is outward of the walls of the container, thus permitting the floor and the walls of the upper container to nest significantly into the lower container. The bail member engages a ledge protruding outwardly from an outer surface of the wall of the upper container. For shorter goods that fit between the floors of the upper and lower containers, this provides a very efficient overall stacking height of the containers.

The bail members can also be moved to upper and lower stack positions, wherein the floor of the upper container is supported by the bail members at two different heights. The goods in the lower container are protected from contact by the upper container while providing an efficient overall stacking height of the upper and lower containers.

The bail member selectively movable between the low nest position, the upper stack position and the lower stack position. The pin is at a first axis in the pin opening when the bail member is in the nest position and when the bail member is in the upper stack position. A first distance from the first axis to the floor is less than a second distance from the support portion to the floor in the upper stack position. The support portion is a third distance from the floor and the pin is at a second axis that is outward of the first axis when the bail member is in the lower stack position, the third distance being less than the second distance.

At least one of the walls has a locking recess complementary to a locking projection protruding from the bail member. In one of the stacking positions, the

bail member is supported on the wall with the locking projection received in the locking recess when the bail member to retain the bail member in the stacking position.

5 In use the bail member of the lower container can be moved from a low nest position in which the support portion of the bail member is the first distance from the floor of the lower container to the high nest position in which the support portion is the second distance from the floor of the lower container, the second distance being greater than the first distance. The support portion is above an uppermost edge of walls of the lower container when the bail member is in the high nest  
10 position. The upper container can then be nested in the lower container such that a floor of the upper container is below the support portion of the bail member and the upper container is supported on the support portion of the bail member.

In one embodiment, an upward projection extending into the pin opening separates a first position and a second position of the pin. The pin is in the first  
15 position in the pin opening when the bail member is in the high nest position. The pin is in the second position in the pin opening when the bail member is in the low nest position. The upward projection assists in retaining the bail member in the high nest position.

## 20 BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages of the present invention can be understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Figure 1 is a perspective view of a container according to a first embodiment  
25 of the present invention with the bail members in a low nest position.

Figure 2 shows the container of Figure 1, with a similar container nested therein.

Figure 3 is a perspective view of the container of Figure 1 with the bail members in an upper stack position.

30 Figure 4 illustrates the container of Figure 3, with a similar container stacked thereon.

Figure 5 is a perspective view of the container of Figure 1 with the bail members in a high nest position.

Figure 6 illustrates the container of Figure 5, with a similar container stacked thereon.

5        Figure 7 is a perspective view of the container of Figure 1 with the bail members in a lower stack position.

Figure 8 is a quarter sectioned perspective view of the container of Figure 7, with a similar container stacked thereon.

10       Figure 9 is a composite sectional view taken along line A-A of Figure 1, showing one of the bail members in the low nest position and the upper stack position.

Figure 10 is a view similar to that of Figure 9, showing the bail member in the high nest position and the lower stack position.

15       Figure 10a is a view similar to that of Figure 10, showing an alternative bail member.

Figure 11 is an end view of the container of Figure 1.

Figure 12 is a bottom plan view of the container of Figure 1.

Figure 13 is a side view of the container of Figure 1.

Figure 14 is a top plan view of the container of Figure 1.

20       Figure 15 is a perspective view of a container according to a second embodiment of the present invention with the bail members in a low nest position.

Figure 16 is a perspective view of the container of Figure 15 with a similar container stacked thereon.

25       Figure 17 is a perspective view of the container of Figure 15 with the bail members in an upper stack position.

Figure 18 illustrates the container of Figure 17 with a similar container stacked thereon.

Figure 19 is a perspective view of the container of Figure 15 with the bail members in a lower stack position.

30       Figure 20 is a quarter interior perspective view of the container of Figure 19, with a similar container stacked thereon.

Figure 21 is a composite sectional view taken along line B-B of Figure 15, showing the three positions of the bail member.

Figure 22 is a top view of the container of Figure 15.

Figure 23 is a bottom view of the container of Figure 15.

5 Figure 24 is a side view of the container of Figure 15.

Figure 25 is an end view of the container of Figure 15.

Figure 26 is a partial exterior perspective view of the container of Figure 15 stacked on the container of Figure 1 in the high nest position.

Figure 27 is a sectional view of the containers of Figure 26.

10 Figure 28 is a view similar to Figure 27, with the lower container in the upper stack position.

Figure 29 illustrates the container of Figure 1 with the bail members in the upper stack position and with the container of Figure 15 stacked thereon.

15 Figure 30 is a perspective view of a container according to a third embodiment of the present invention with the bail members in a low nest position.

Figure 31 is a perspective view of the container of Figure 30 with the bail members in an upper stack position.

Figure 32 is a perspective view of the container of Figure 30 with the bail members in a high nest position.

20 Figure 33 illustrates the container of Figure 32, with a similar container stacked thereon.

Figure 34 is a perspective view of the container of Figure 30 with the bail members in a lower stack position.

25 Figure 35 is a composite sectional view taken along line C-C of Figure 30, showing one of the bail members in the four positions.

Figure 36 is a perspective view of a container according to a fourth embodiment of the present invention with the bail members in a low nest position.

Figure 37 is a composite sectional view taken along line D-D of Figure 36, showing one of the bail members in the three positions.

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## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A container 10 according to the present invention is shown in Figure 1. The container 10 includes a floor 12, a pair of opposed side walls 14 and a pair of opposed end walls 16. A pair of notches 17 are formed at the bottom of the end walls 16 and the floor 12. The notches 17 each define a channel which extends from one end wall 16 to the other.

Two bail members 18 are each mounted to each end wall 16. While they may take a variety of shapes, bail members 18 are shown having a generally cylindrical support portion 19 that extends across the length of the container 10. Each bail member 18 includes a pair of arms 21 extending transversely from the support portion 19. Near the intersection of each arm 21 with the support portion 19, a locking projection 22 protrudes from the support portion 19 and arm 21.

The end walls 16 each include an upper wall portion that has an outer wall portion 20 spaced from an inner wall portion 23. A lower wall portion 24 is generally aligned below the inner wall portion 23, such that the outer wall portion 20 forms a support or ledge 25 along the end wall 16. The side walls 14 similarly include ledges 26 protruding outwardly from the side walls 16 at a height even with the ledges 25 on the end walls 16. The ledges 26 on the side walls 14 include lower concave recesses 28 formed along their length.

The inner wall portion 23 includes an upper support rest 36 at a height above the floor 12 for supporting the bail member 18 at an upper stack position. Each upper support rest 36 includes an upwardly open concave recess 37 adjacent a locking recess 38. The concave recess 37 is a notch formed in the inner wall portion 23. The locking recess 38 is between the inner wall portion 23 and the outer wall portion 20. The inner wall portion 23 further includes a lower support rest 42 which is closer to the floor than the upper support rest 36 for supporting the bail member 18 at a lower stack position.

Elongated pin openings 30 are formed in each outer wall portion 20 to trap pins 32 at the outer ends of the bail members 18. The pins 32 are slidable and pivotable within the pin openings 30, such that the bail members 18 can be moved to a plurality of positions and orientations. In Figures 1 and 2, the bail members 18 are in a low nest position, where the support portions 19 of the bail members 18 are

disposed on the side walls 14 and the pins 32 are at first pivot axes in the pin openings 30. In this position, as shown in Figure 2, a similar container 10' can be substantially nested within the container 10, with the floor 12' nested within the walls 16 of the container 10. The ledge 26' of the side wall 14' of the upper  
5 container 10' is supported on the side wall 14 of the lower container 10, with the support portion 19 of the bail member 18 of the lower container 10 received in the concave recess 28' on the underside of the ledge 26' of the upper container 10'.

The bail members 18 can be pivoted about the pins 32 at the first axes from the low nest position of Figure 1 to the upper stack position shown in Figure 3. In  
10 the upper stack position, each support portion 19 is supported on two upper support rests 36 on the inner wall portions 23, inwardly of the side walls 14 and suspended above the floor 12 such that an upper surface of the support portion 19 is substantially even with the upper edges of the walls 14, 16. The arms 21 of the bail members 18 are received between the inner wall portions 23 and outer wall portions  
15 20. The inner and outer wall portions 23, 20 prevent contact with the arm 21 by users or by other containers or objects, which prevents the pin 32 from being knocked out of the pin opening 30. The locking projection 22 (visible in Figure 1) is received in the locking recess 38 (visible in Figure 1) of the upper support rest 36. The locking projection 22 and locking recess 38 interlock to retain the support  
20 portion 19 of the bail members 18 in the upper support rest 36.

Figure 4 shows the container 10 with the bail member 18 in the upper stack position supporting a similar container 10'. The support portion 19 of the bail member 18 of the lower container 10 is received in the notches 17' of the upper container 10' such that the floor 12' of the upper container 10' is supported by the  
25 bail members 18. This position provides the maximum storage capacity in the container 10 and transfers load to the bail members 18, thus keeping the weight of the upper container 10' off the container 10 contents.

Figure 5 shows the container 10 with the bail members 18 in a high nest position. The pins 32 of the bail members 18 are slid to a second axis at an outer  
30 end of the pin opening 30 and the bail members 18 are pivoted to an upright position, as shown. In the high nest position, the support portions 19 of the bail members 18 are spaced above uppermost edges of the side walls 14 and end walls

16. The inner surface of the outer wall portion 20 may optionally include a slight projection 44, past which the bail member 18 arm 21 snaps to retain the bail member 18 in the high nest position.

Figure 6 shows the container 10 with the bail member 18 in the high nest position supporting a similar container 10', such that the floor 12' of the upper container 10' is suspended at a distance above the floor 12 of the lower container 10 greater than when the bail members are in the low nest position of Figures 1 and 2. The floor 12' of the upper container 10' is not in contact with the support portion 19 of the bail member 18 of the lower container 10. In this position, the upper container 10' is supported by the support portions 19 of the bail members 18 of the lower container 10, with the support portions 19 received in the concave recesses 28' formed in the ledges 26' on the side walls 14'. This position provides a small storage space between the floors 12, 12' of the containers, that is slightly larger than the low nest position of Figures 1 and 2, without the structural complexities that would be necessary to provide bail members 18 that would extend so sufficiently down into the container to be received under the floor 12' of the upper container.

Figure 7 shows the container 10 with the bail members 18 in a lower stack position on lower support rests 42 on the inner wall portions 23 and with the pins 32 at third pivot axes in the pin openings 30. The lower support rests 42 are notches formed in the inner wall portion 23 to impede movement of the bail member 18 out of the selected position. The arms 21 of the bail members 18 are received between the inner wall portions 23 and outer wall portions 20. The inner and outer wall portions 23, 20 prevent contact with the arm 21 by users or by other containers or objects, which prevents the pin 32 from being knocked out of the pin opening 30 when the bail members 18 are in the lower stack position.

As shown in Figure 8, the upper container 10' is supported above the floor 12 by the bail member 18 in the notch 17' of the upper container 10' to create a middle-sized storage area between the floors 12, 12' that is larger than that provided by the high and low nest positions, but smaller than that provided by the high stack position.

Figures 9 and 10 are sectional views taken along line A-A of Figure 1, showing in a composite view, the four positions of the bail members 18 and pins 32,

with the reference characters "a" through "d" appended to signify the four positions. For clarity, two positions are shown in Figure 9, while the other two positions are shown in Figure 10. The pin opening 30 in the outer wall portion 20, which would not otherwise be visible in this view, is superimposed for reference. The pin 32 of  
5 bail member 18 is pivotable and slidable in pin opening 30, such that the bail member 18 can be moved between any of the positions shown in Figures 9 and 10.

Referring to Figure 9, bail member 18a is in the low nest position with the pin 32a in the first pivot axis in the pin opening 30. In the low nest position, the support portion 19a of the bail member 18a is not inwardly of the side walls 14, and  
10 thus permits nesting of a similar container in container 10. In the low nest position, the support portion 19a is generally vertically aligned with the concave recess 28 on the ledge 26.

Bail member 18b is in the upper stack position, with the pin 32b also at the first pivot axis in the pin opening 30. In the upper stack position, the support portion  
15 19b of the bail member 18b is supported on upper support rest 36 of the inner wall portion 23, at a height substantially equal to the height of the walls 14, 16. The locking projection 22b is received in the locking recess 38 of the upper support rest 36. The bail member 18 is simply pivotable about the first axis (shown as pin 32a and 32b) between the low nest position (bail member 18a) and the upper stack  
20 position (bail member 18b).

Referring to Figure 10, bail member 18c is in the lower stack position with the pin 32c in the third pivot axis in the pin opening 30, between inner and outer ends of the pin opening 30. In the lower stack position, the support portion 19c of the bail member 18c is supported on lower support rest 42 of the inner wall portion  
25 23.

Bail member 18d is in the high nest position with the pin 32d at the second pivot axis at the outer end of the pin opening 30. In the high nest position, the support portion 19d is generally vertically aligned with the concave recess 28 on the ledge 26. The support portion 19d of the bail members 18d is spaced above  
30 uppermost edges of the side walls 14 and end walls 16.

The container 10 provides a low nest position (Figures 1 and 2) providing a minimal clearance between floors 12, 12' of stacked containers 10, 10', a high nest

position (Figures 5 and 6) providing a greater, second clearance, a lower stack position (Figures 7 and 8) providing a still greater, third clearance and an upper stack position (Figures 3 and 4) providing a greatest, fourth clearance. Depending on how much is to be stored in the container 10, the bail members 18 can be adjusted to support similar containers 10' stacked thereon in the four positions without resting on the contents and without unnecessarily occupying space.

Figure 10a is a view similar to that of Figure 10, showing an alternative bail member 58 with a heel 60 projecting downwardly from the arm 62 outwardly of the pin 64. The heel 60 may optionally be used instead of or in addition to the optional projection 44 shown in Figure 5 to assist in retaining the bail member 58 in the high nest position. The heel 60 fits snugly or snap-fits into a recess on the wall 16.

Figure 11 shows an end view of the container 10. Figure 12 shows a bottom view of the container 10. Figure 13 is a side view of the container 10. Figure 14 is a top view of the container 10.

A container 110 according to a second embodiment of the present invention is shown in Figures 15-25. Components corresponding to those in the first embodiment are given a similar reference numeral, preappended with the numeral "1." The container 110 includes side walls 114 and end walls 116 extending upwardly from a floor 112. End walls 116 include outer wall portions 120 and inner wall portions 123. Pin openings 130 are formed in the outer wall portions 123 and receive the pins 132 of the bail members 118. The side walls 114 include ledges 126 protruding outwardly from the side walls 116 at a height even with the ledges 125 on the end walls 116. The ledges 126 on the side walls 114 include concave lower recesses 128 formed along their length.

In Figures 15 and 16, the bail members 118 are shown in a low nest position, with the support portions 119 of the bail members 118 on the side walls 114 and with the pins 132 at first pivot axes at inner ends of the pin openings 130. In this position, a similar container 110' can nest within the container 110 when stacked thereon, with the floor 112' of the upper container 110' at a minimal clearance above the floor 112 of the lower container 110, as shown in Figure 16. The ledge 126' of the side wall 114' of the upper container 110' is supported on the side wall 114 of the lower container 110, with the support portion 119 of the bail member 118

of the lower container 110 received in the recess 128' of the ledge 126' of the upper container 110'.

In Figures 17 and 18, the bail members 118 are shown in the upper stack position with the support portions 119 of the bail members 118 supported on support rests 136. In this position, the floor 112' of a similar container 110' is supported in notches 117' on the bail members 118 at a maximum height above the floor 112, as shown in Figure 18. The pins 132 are still at the first pivot axes at the inner ends of the pin openings 130, as the bail members 118 are pivotable about the first pivot axes between the nest position (Figures 15 and 16) and the upper stack position (Figures 17 and 18).

In Figures 19 and 20, the bail members 118 are shown in the lower stack position with the support portions 119 of the bail members 118 supported on the support rests 142. In this position, the floor 112' of a similar container 110' is supported on the bail members 118 above the floor 112, and the upper container 110' partially nests within the container 110 without putting contacting the contents of the container 110.

Figure 21 is an interior composite view of an end wall 116 of the container 110, showing all three of the positions of the bail members 118 and pins 132, with the reference characters "a" through "c" appended to signify the three positions. Bail member 118a is in the low nest position with the pin 132a at the first pivot axis in the pin opening 130. In the low nest position, the support portion 119a of the bail member 118a is not inwardly of the side walls 114, and thus permits nesting of a similar container in container 110.

Bail member 118b is in the upper stack position with the pin 132b at the first pivot axis in the pin opening 130. In the upper stack position, the support portion 119b of the bail member 118b is supported on support rest 136 of the inner wall portion 123, at a height substantially equal to the height of the walls 114, 116. In the upper stack position, the locking projection 122b is received in the locking recess 138 of the upper support rest 136. The locking projection 122b and locking recess 138 interlock to retain the support portion 119b of the bail member 118b in the upper support rest 136.

Bail member 118c is in the lower stack position with the pin 132c in the second pivot axis in the pin opening 130, between inner and outer ends of the pin opening 130. In the lower stack position, the support portion 119c of the bail member 118c is supported on support rest 142 of the inner wall portion 123.

5        Figure 22 shows a top view of the container 110. Figure 23 shows a bottom view of the container 110. Figure 24 is a side view of the container 110. Figure 25 is an end view of the container 110.

10        The container 110 of Figures 15-25 provides three selectable heights between floors 112 of stacked containers, including the low nest position (Figures 15 and 16), upper stack position (Figures 17 and 18) and lower stack position (Figures 19 and 20) Depending on how much is to be stored in the container 110, the bail members 118 can be adjusted to support similar containers 110' stacked thereon in the three positions without resting on the contents and without unnecessarily occupying space.

15        In both embodiments, the walls and floor of the container 10, 110 are integrally molded as a single unitary structure from a plastic material such as HDPE, or other suitable materials, for example polypropylene, via an injection molding or other suitable process. The bail members 18, 118 may be formed of any suitable material, but are preferably 50% glass-filled nylon or other composite material, but  
20        could also be steel. The container 10 of Figures 1-14 and the container 110 of Figures 15-25 are also designed to be stacked together as shown in Figures 26-29. In the embodiments shown, the container 10 is 24 inches by 20 inches, while the container 110 is 24 inches by 16 inches. Of course, other sizes would be within the scope of the present invention, but these sizes are used for purposes of illustration  
25        below.

30        In Figures 26 and 27, the bail member 18 of the lower container 10 is in the high nest position, such that the support portion 19 of the bail member 18 is spaced above the uppermost edges of the side walls 14 and end walls 16. The support portion 19 is received within the recess 128 on the ledge 126 of the upper container 110 to support the container 110 partially nested within the container 10, thereby protecting the contents of the lower container 10 between floors 12, 112 while efficiently stacking the containers 10, 110. It should be noted that, in embodiments

having the dimensions stated above, there will be a 2-inch gap between the side walls 116 of the upper container 110 and the side walls 16 of the lower container 10, but stability is not affected.

Figures 28 and 29 illustrate the container 110 stacked on the container 10 while the bail members 18 are in the upper stack position. Figure 28 shows a composite view of the lower container 10, showing the bail member 18 in three of the four positions, again designated 18b-d. As shown, the notch 117 of the upper container 110 aligns with the bail member 18b in the upper stack position and the bail member 18c in the lower stack position.

A container 210 according to another embodiment of the present invention is shown in Figure 30. The container 210 is similar in many respects to the container 10 of Figures 1-14, and components corresponding to those in the first embodiment are given a similar reference numeral, preappended with the numeral "2." Unless otherwise indicated here, components in this embodiment function the same as their corresponding components in the first embodiment, and that description is incorporated here by reference. The container 210 includes a floor 212, a pair of opposed side walls 214 and a pair of opposed end walls 216. A pair of notches 217 are formed at the bottom of the end walls 216 and the floor 212. The notches 217 each define a channel which extends from one end wall 216 to the other.

Two bail members 218 are each mounted to each end wall 216. While they may take a variety of shapes, bail members 218 are shown having a generally cylindrical support portion 219 that extends across the length of the container 210. Each bail member 218 includes a pair of arms 221 extending transversely from the support portion 219. The bail members 218 are shown without the locking projection 22 of Figure 1, but could optionally include that feature.

The end walls 216 each include an upper wall portion that has an outer wall portion 220 spaced from an inner wall portion 223. As shown in Figure 30, the outer wall portions 220 are formed in each upper corner of the end walls 216. A lower wall portion 224 is generally aligned below the inner wall portion 223, such that the outer wall portion 220 forms a support or ledge 225 along the end wall 216. The side walls 214 similarly include ledges 226 protruding outwardly from the side



walls 16 at a height even with the ledges 225 on the end walls 216. The ledges 226 on the side walls 214 include lower concave recesses 228 formed along their length.

The inner wall portion 223 includes an upper support rest 236 at a height above the floor 212 for supporting the bail member 218 at an upper stack position.

5 Each upper support rest 236 includes an upwardly open concave recess 237 adjacent a inclined surface 240. The concave recess 237 is a notch formed in the inner wall portion 223. The inclined surface 240 is between the inner wall portion 223 and the outer wall portion 220. The inner wall portion 223 further includes a lower support rest 242 which is closer to the floor than the upper support rest 236 for supporting

10 the bail member 218 at a lower stack position.

The end walls 216 of the container 210 are corrugated to resist warpage, such that they include alternating channels 270 and ridges 272 on the interior surface of the end walls 216, with corresponding ridges 274 and channels 276 aligned on the outer surface. The channels 270 on the interior surface are tapered downwardly, as

15 are the corresponding ridges 274 on the outer surface. When like containers 210 are nested, the ridges 274 on the outer surfaces of the end walls 216 of one container 210 are received within the channels 270 on the interior surface of the other container 210.

End walls 216 include recesses 280 formed on the outer surfaces with

20 corresponding gussets 282 on the inner surfaces. The recesses 280 and gussets 282 are vertically aligned with the upper support rests 236 to provide clearance between the lower wall portion 224 of the container 210 and the upper support rests 236 of a similar container on which the container 210 is stacked when the bail members 218 are on the upper support rests 236 (as shown in Figure 31).

25 Elongated pin openings 230 are formed in each outer wall portion 220 to trap pins 232 at the outer ends of the bail members 218. In the embodiment of Figure 30, the elongated pin openings 230 are slightly curved, convexly upward and include a substantially vertical leg 231 extending downwardly at an outer end. The pins 232 are slidable and pivotable within the pin openings 230, such that the bail members

30 218 can be moved to a plurality of positions and orientations. In Figure 30, the bail members 218 are in a low nest position, where the support portions 219 of the bail members 218 are disposed on the side walls 214 and the pins 232 are at first pivot

axes at one end of the pin openings 230. In this position, a similar container (not shown) can be substantially nested within the container 210, in a manner similar to that shown in Figure 2 with respect to the first embodiment.

5 The bail members 218 can be pivoted about the pins 232 at the first axes from the low nest position of Figure 30 to the upper stack position shown in Figure 31. In the upper stack position, each support portion 219 is supported on the two upper support rests 236 on the inner wall portions 223, inwardly of the side walls 214 and suspended above the floor 212 such that an upper surface of the support portion 219 is substantially even with the upper edges of the walls 214, 216. The  
10 arms 221 of the bail members 218 are received between the inner wall portions 223 and outer wall portions 220. The inner and outer wall portions 223, 220 prevent contact with the arm 221 by users or by other containers or objects, which prevents the pin 232 from being knocked out of the pin opening 230. In this position, a similar container (not shown) can be supported on the bail members 218, in a  
15 manner similar to that shown in Figure 4 with respect to the first embodiment. This position provides the maximum storage capacity in the container 210 and transfers load to the bail members 218, thus keeping the weight of the upper container off the container 210 contents.

Figure 32 shows the container 210 with the bail members 218 in a high nest  
20 position. The pins 232 of the bail members 218 are slid to a second axis at a lower end of the vertical leg 231 of each pin opening 230 and the bail members 218 are pivoted to an upright position, as shown. In the high nest position, the support portions 219 of the bail members 218 are spaced above uppermost edges of the side walls 214 and end walls 216. With the pins 232 at the lower ends of the vertical legs  
25 231 of the pin openings 230, the pins 232 cannot slip out of position. Weight on the bail members 218 will retain each pin 232 at the second axis.

Figure 33 shows the container 210 with the bail member 218 in the high nest position supporting a similar container 210', such that the floor 212' of the upper container 210' is suspended at a distance above the floor 212 of the lower container  
30 210 greater than when the bail members are in the low nest position of Figure 30. The floor 212' of the upper container 210' is not in contact with the support portion 219 of the bail member 218 of the lower container 210. In this position, the upper

container 210' is supported by the support portions 219 of the bail members 218 of the lower container 210, with the support portions 219 received in the concave recesses 228' formed in the ledges 226' on the side walls 214'. This position provides a small storage space between the floors 212, 212' of the containers, that is slightly larger than the low nest position of Figure 1, without the structural complexities that would be necessary to provide bail members 218 that would extend sufficiently down into the container to be received under the floor 212' of the upper container. The vertical leg 231 includes a slight inward projection 233 above the pin 232 at the second axis position, as shown in Figure 33. An upward projection 234 is between the first axis position and the second axis position and partially defines the vertical leg 231. The inward projection 233 and the upward projection 234 further prevent the bail member 218 from slipping out of the high nest position. To move the bail member 218 to or from the high nest position, the bail member 218 must first be moved upwardly so that the pin 232 is moved over the upward projection 234.

Figure 34 shows the container 210 with the bail members 218 in a lower stack position on lower support rests 242 on the inner wall portions 223 and with the pins 232 at third pivot axes in the pin openings 230. The lower support rests 242 are notches formed in the inner wall portion 223 to impede movement of the bail member 218 out of the selected position. The arms 221 of the bail members 218 are received between the inner wall portions 223 and outer wall portions 220. The inner and outer wall portions 223, 220 prevent contact with the arm 221 by users or by other containers or objects, which prevents the pin 232 from being knocked out of the pin opening 230 when the bail members 218 are in the lower stack position. In this position, a similar container (not shown) can be supported on the bail members 218, in a manner similar to that shown in Figure 8 with respect to the first embodiment to create a middle-sized storage area that is larger than that provided by the high and low nest positions, but smaller than that provided by the high stack position.

Figures 35 is a sectional view taken along line C-C of Figure 30, showing in a composite view, the four positions of the bail members 218 and pins 232, with the reference characters "a" through "d" appended to signify the four positions. The pin

opening 230 in the outer wall portion 220, which would not otherwise be visible in this view, is superimposed for reference. The pin 232 of bail member 218 is pivotable and slidable in pin opening 230, such that the bail member 218 can be moved between any of the positions shown in Figure 35.

5 Referring to Figure 35, bail member 218a is in the low nest position with the pin 232a in the first pivot axis in the pin opening 230. In the low nest position, the support portion 219a of the bail member 218a is not inwardly of the side walls 214, and thus permits nesting of a similar container in container 210. In the low nest position, the support portion 219a is generally vertically aligned with the concave  
10 recess 228 on the ledge 226.

Bail member 218b is in the upper stack position, with the pin 232b also at the first pivot axis in the pin opening 230. In the upper stack position, the support portion 219b of the bail member 218b is supported on upper support rest 236 of the inner wall portion 223, at a height substantially equal to the height of the walls 214,  
15 216. The arm 221b is received in the inclined surface 240 of the upper support rest 236.

Bail member 218c is in the lower stack position with the pin 232c in the third pivot axis in the pin opening 230, between inner and outer ends of the pin opening 230. The pin 232c at the third pivot axis is slightly above the inner end of the pin  
20 opening 230. In the lower stack position, the support portion 219c of the bail member 218c is supported on lower support rest 242 of the inner wall portion 223.

Still referring to Figure 35, bail member 218d is in the high nest position with the pin 232d at the second pivot axis at a lower end of the vertical leg 231 of the pin opening 230, below the inward projection 231. In the high nest position, the  
25 support portion 219d is generally vertically aligned with the concave recess 228 on the ledge 226. The support portion 219d of the bail member 218d is spaced above uppermost edges of the side walls 214 and end walls 216.

The container 210 provides a low nest position (Figure 30) providing a minimal clearance between floors of stacked containers 210, a high nest position  
30 (Figures 32 and 33) providing a greater, second clearance, a lower stack position (Figure 34) providing a still greater, third clearance and an upper stack position (Figure 31) providing a greatest, fourth clearance. Depending on how much is to be

stored in the container 210, the bail members 218 can be adjusted to support similar containers stacked thereon in the four positions without resting on the contents and without unnecessarily occupying space.

Figure 36 illustrates a container 310 according to a fourth embodiment of the present invention, with the bail members 318 in the low nest position. The container 310 is similar to that of Figure 30, but does not include the high nest position of the embodiment of Figure 30. Components corresponding to those in the embodiment of Figure 30 are given a similar reference numeral, preappended with the numeral "3" instead of "2." Unless otherwise indicated here, components in this embodiment function the same as their corresponding components in the third embodiment, and that description is incorporated here by reference.

Figure 37 is an interior composite view of an end wall 316 of the container 310, showing all three of the positions of the bail members 318 and pins 332, with the reference characters "a" through "c" appended to signify the three positions. Bail member 318a is in the low nest position with the pin 332a at the first pivot axis in the pin opening 330. In the low nest position, the support portion 319a of the bail member 318a is not inwardly of the side walls 334, and thus permits nesting of a similar container in container 310.

Bail member 318b is in the upper stack position with the pin 332b at the first pivot axis in the pin opening 330. In the upper stack position, the support portion 319b of the bail member 318b is supported on support rest 336 of the inner wall portion 323, at a height substantially equal to the height of the walls 334, 316.

Bail member 318c is in the lower stack position with the pin 332c in the second pivot axis in the pin opening 330, between inner and outer ends of the pin opening 330. In the lower stack position, the support portion 319c of the bail member 318c is supported on support rest 342 of the inner wall portion 323.

While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention. There are different designs of containers that would benefit from the present invention.

**CLAIMS**

1. A container capable of supporting a second container in a plurality of positions relative to the container, the container comprising:
- 5 a floor;
- an upstanding wall structure including a plurality of walls extending upwardly from the floor, the plurality of walls including a first wall having an elongated pin opening, the pin opening defining a first position and a second position separated by an upward projection; and
- 10 a bail member having a support portion and an arm extending transversely from the support portion, a pin extending from the arm and received in the pin opening such that the pin is pivotable and slidable in the pin opening between the first position and the second position, the bail member selectively movable to a high nest position in which the support portion is vertically aligned outwardly of an outer
- 15 periphery of the floor, the pin in the second position of the pin opening when the bail member is in the high nest position.
2. The container of claim 1 wherein the support portion and the pin are vertically aligned outwardly of the first wall when the bail member is in the high
- 20 nest position.
3. The container of claim 2 wherein the first wall includes a support projecting outwardly from the outer surface, the support being at least substantially vertically aligned with the support portion in the high nest position.
- 25
4. The container of claim 2 wherein the support portion includes a concave lower surface.

5. The container of claim 1 wherein the bail member is movable from the high nest position to a low nest position in which the support portion is vertically aligned outwardly of the outer periphery of the floor, wherein a distance from the support portion to the floor is greater when the bail member is in the high nest position than  
5 when the bail member is in the low nest position.

6. The container of claim 5 wherein the pin is at the first position when the bail member is in the low nest position.

10 7. The container of claim 1 wherein the pin extends transversely from the arm.

8. The container of claim 1 wherein the first wall includes an outer wall portion and an inner wall portion spaced inwardly from the outer wall portion, at least one of the inner and outer wall portions having the elongated pin opening.  
15

9. The container of claim 8 wherein the first wall includes a lower wall portion and wherein the inner and outer wall portions are an upper wall portion, wherein the inner wall portion is aligned with the lower wall portion and wherein the outer wall portion is positioned outwardly of the lower wall portion to at least partially define a ledge projecting outwardly from an outer surface of the first wall, the ledge being at  
20 least substantially vertically aligned with the support portion in the high nest position

10. The container of claim 1 wherein the bail member is further movable  
25 between a first stack position in which the support portion is a first distance from the floor and a second stack position in which the support portion is a second distance from the floor, the second distance being different from the first distance, wherein the support portion of the bail member is vertically aligned inwardly of the outer periphery of the floor when the bail member is in the first stack position and when  
30 the bail member is in the second stack position.

11. The container of claim 9 wherein the pin is in the first position when in the low nest position and when in the first stack position.

12. The container of claim 1 further including a projection extending into the elongated pin opening above the pin when the pin is at the second position.

13. A container capable of supporting a second container in a plurality of positions relative to the container, the container comprising:

a floor;

an upstanding wall structure including a plurality of walls extending upwardly from the floor, the plurality of walls including a first wall having an elongated pin opening, the pin opening extending from an inner end to an outer, generally vertical leg vertically aligned outwardly of an outer periphery of the floor; and

a bail member having a support portion and an arm extending transversely from the support portion, a pin extending from the arm and received in the pin opening such that the pin is pivotable and slidable in the pin opening between the inner end and the leg, the bail member selectively movable to a high nest position in which the pin is at a lower end of the leg.

14. The container of claim 13 wherein the support portion is at least substantially aligned with the pin when the bail member is in the high nest position.

15. The container of claim 13 further including an upward projection extending into the elongated pin opening between the inner end and the leg.

16. The container of claim 13 further including an inward projection extending inwardly into the elongated pin opening above the pin when the pin is at the lower end of the leg.



17. A container capable of supporting a second container in a plurality of positions relative to the container, the container comprising:

a floor;

a wall extending upwardly from the floor; and

5 a bail member having a support portion and an arm extending transversely from the support portion, the arm pivotably and slidably connected to the wall, the bail member selectively movable between a low nest position and a high nest position, wherein the support portion is vertically aligned outwardly of an outer periphery of the floor in the low nest position and in the high nest position, wherein  
10 a distance from the support portion to the floor is greater when the bail member is in the high nest position than when the bail member is in the low nest position, at least a portion of the bail member moving upwardly from a first position and then downwardly to a second position when the bail member is moved from the low nest position to the high nest position.

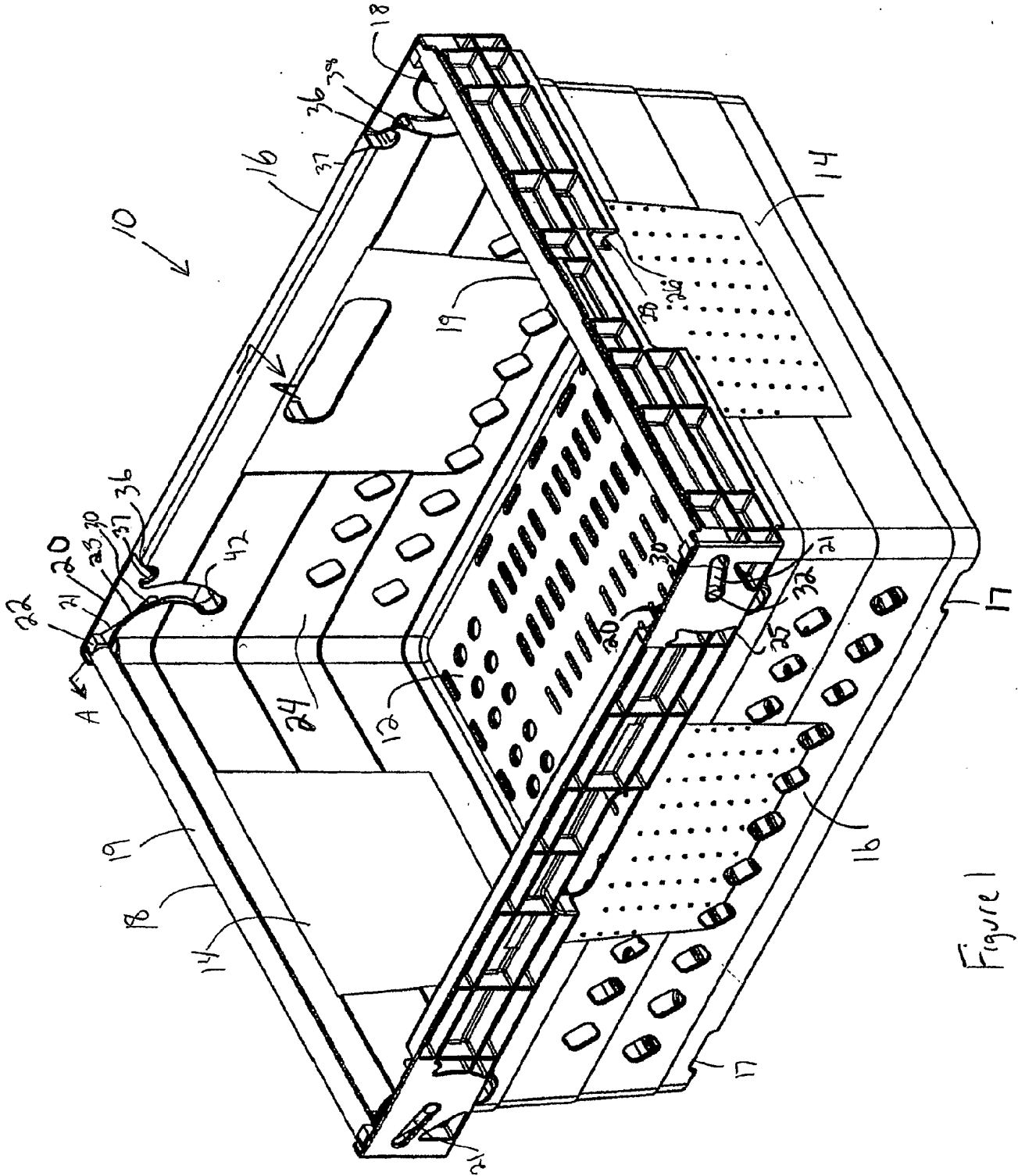
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18. The container of claim 17 wherein the at least a portion of the bail member is a pin extending transversely to the arm of the bail member.

19. A method for stacking an upper container onto a lower container including  
20 the steps of:

a) moving a bail member of the lower container from a low nest position in which a support portion of the bail member is a first distance from a floor of the lower container to a high nest position in which the support portion is a second distance from the floor of the lower container, the second distance greater  
25 than the first distance, the support portion above an uppermost edge of walls of the lower container when the bail member is in the high nest position, said step a) further including the step of moving at least a portion of the bail member upwardly from a first position and then downwardly to a second position; and

b) nesting the upper container in the lower container such that a floor of  
30 the upper container is below the support portion of the bail member and the upper container is supported on the support portion of the bail member.



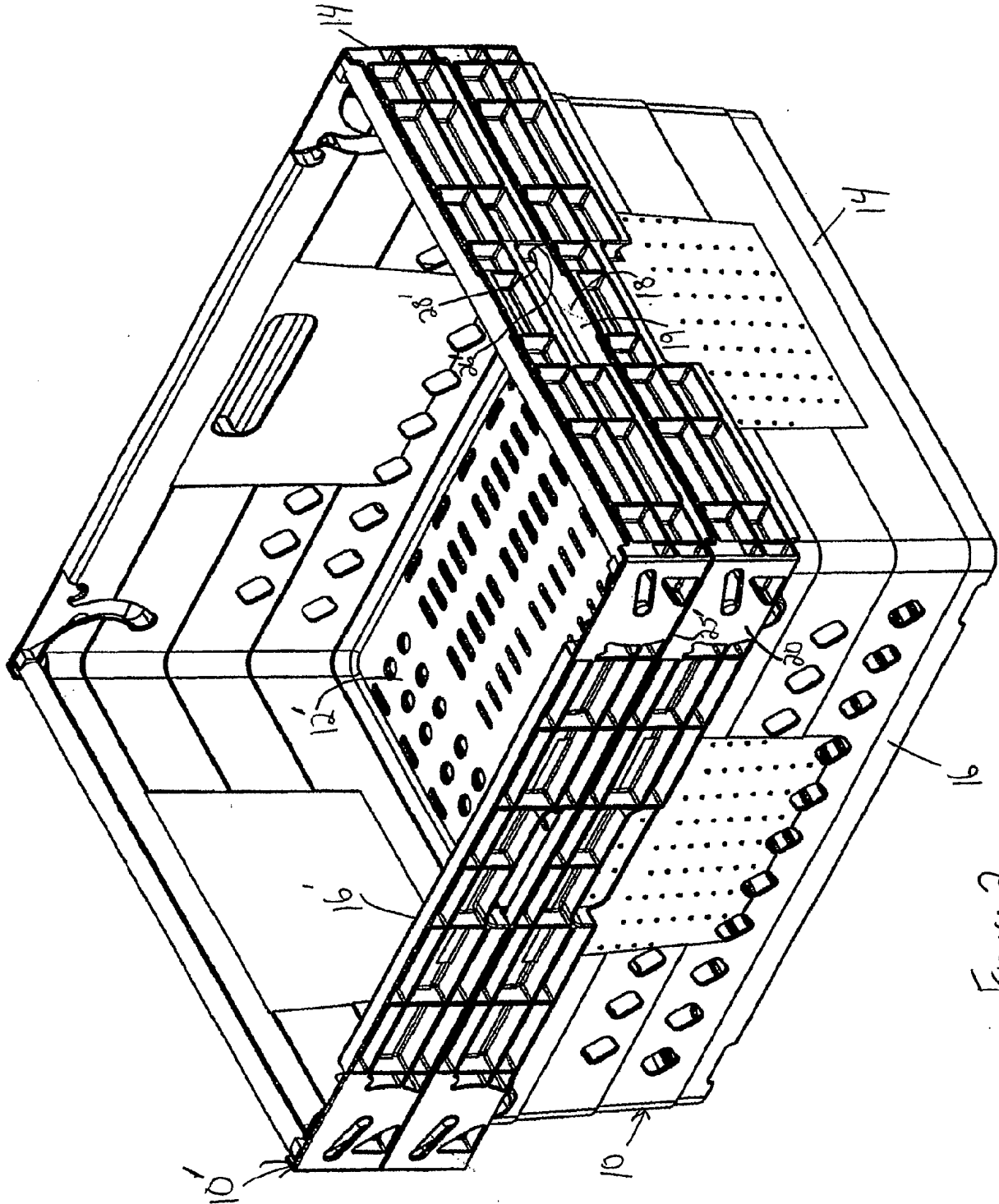


Figure 2

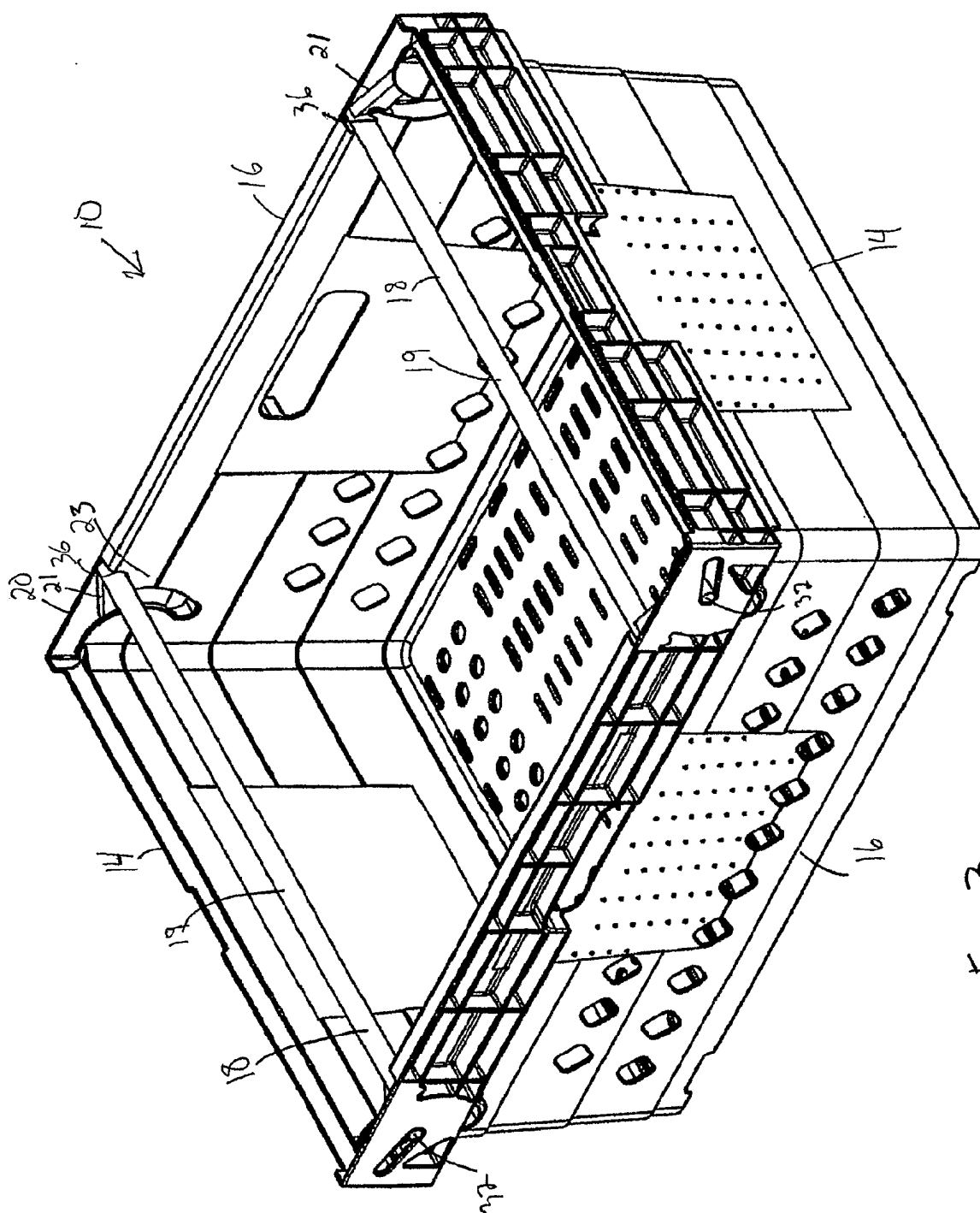


Figure 3

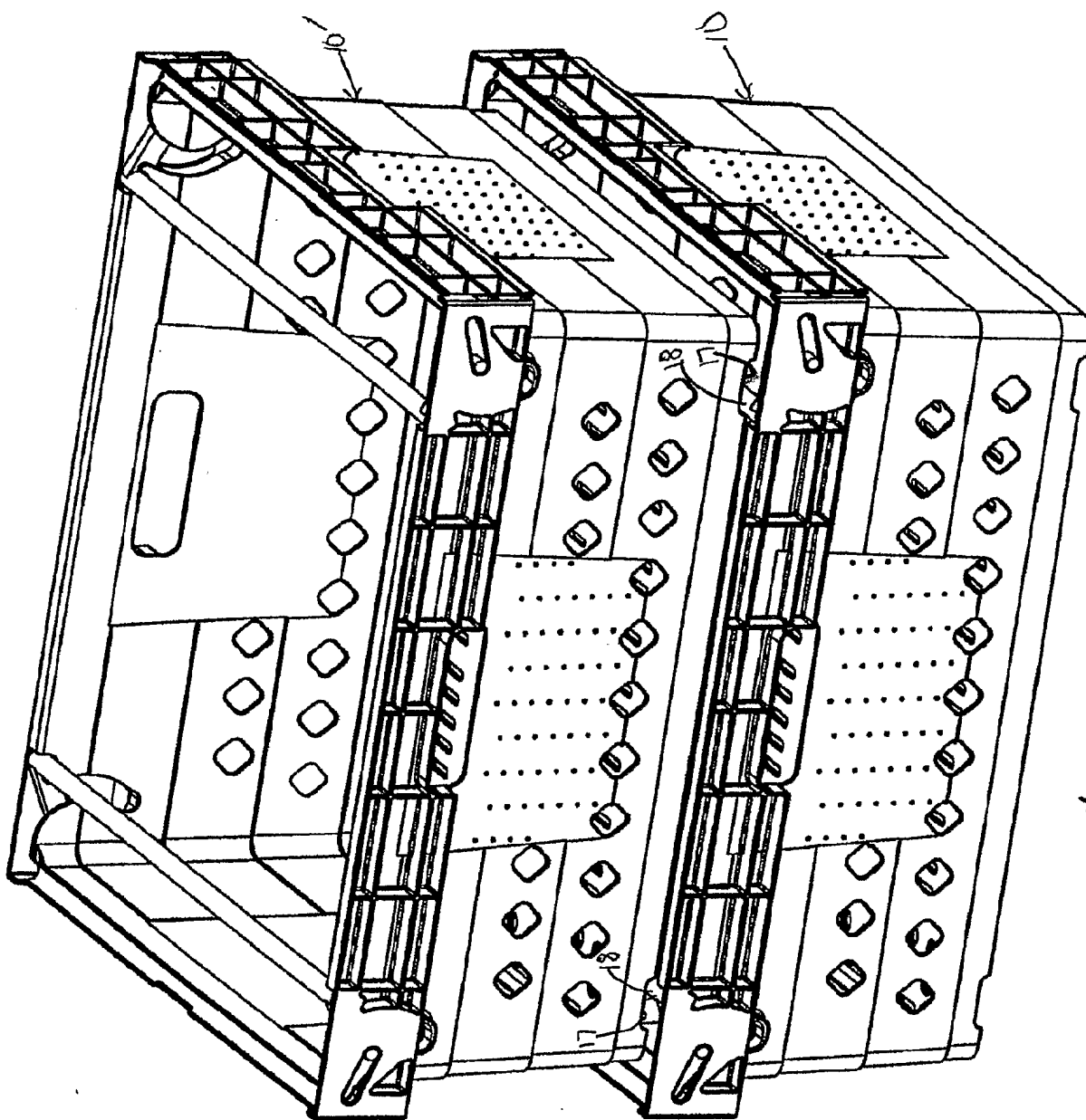


Figure 4

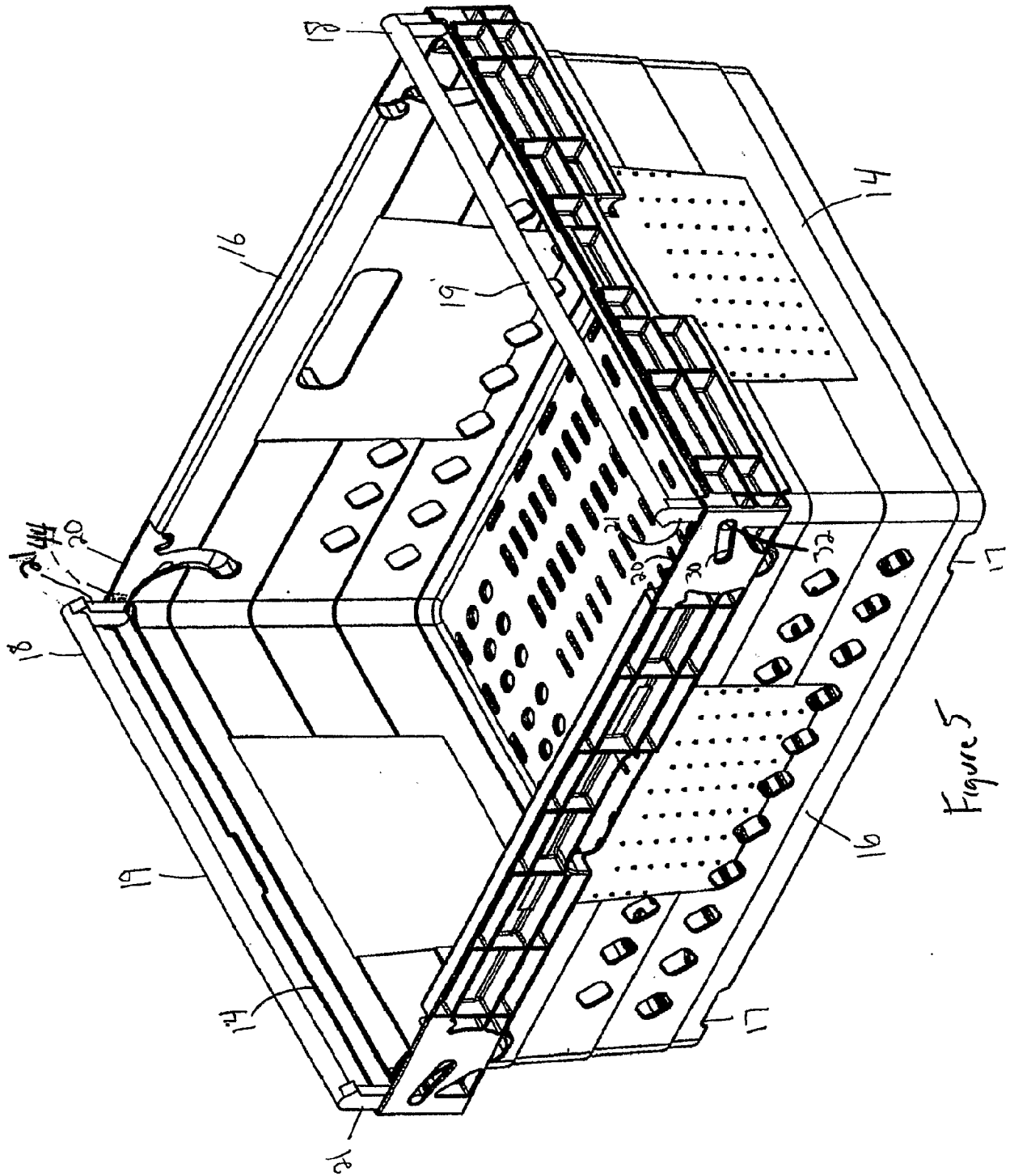


Figure 5

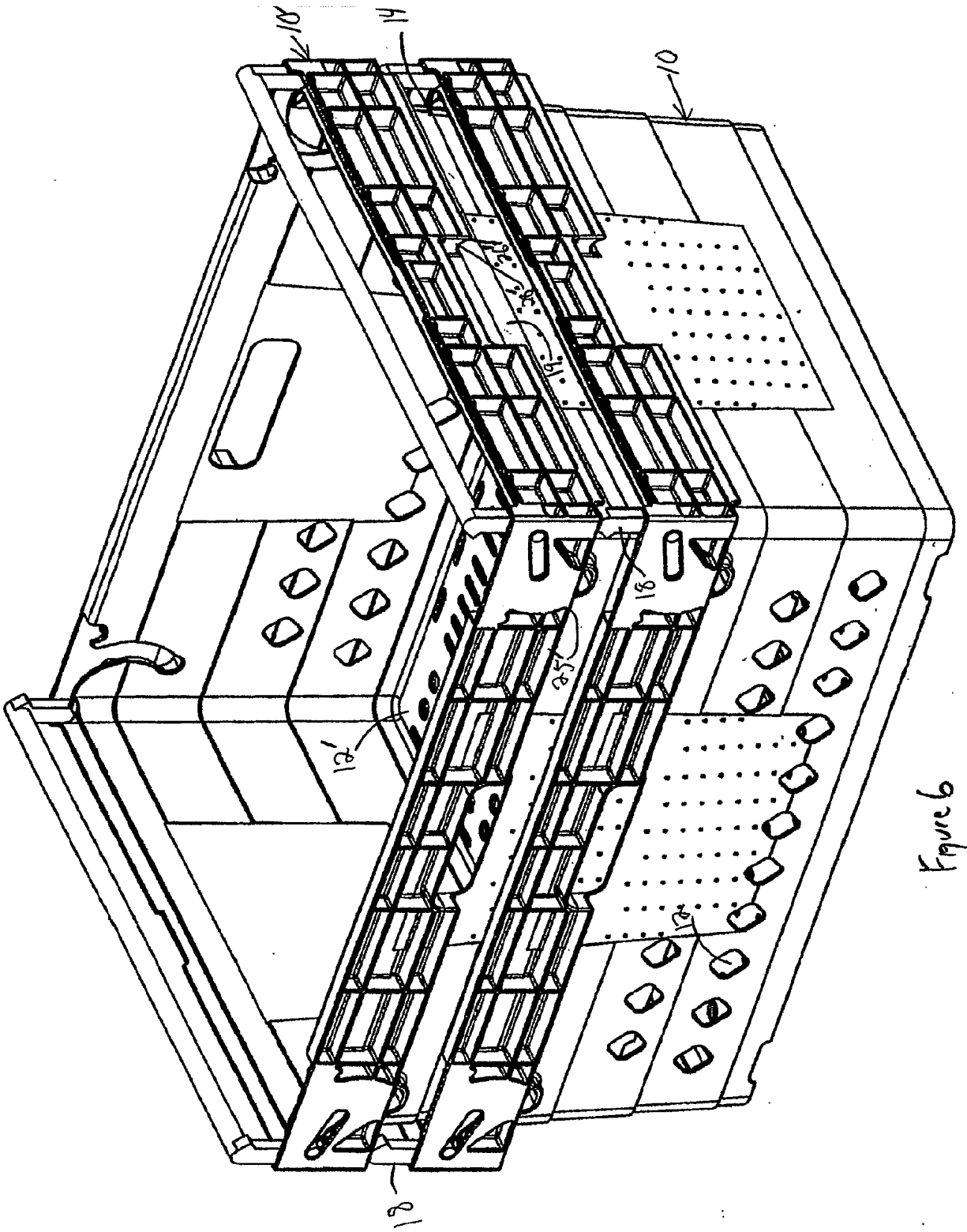
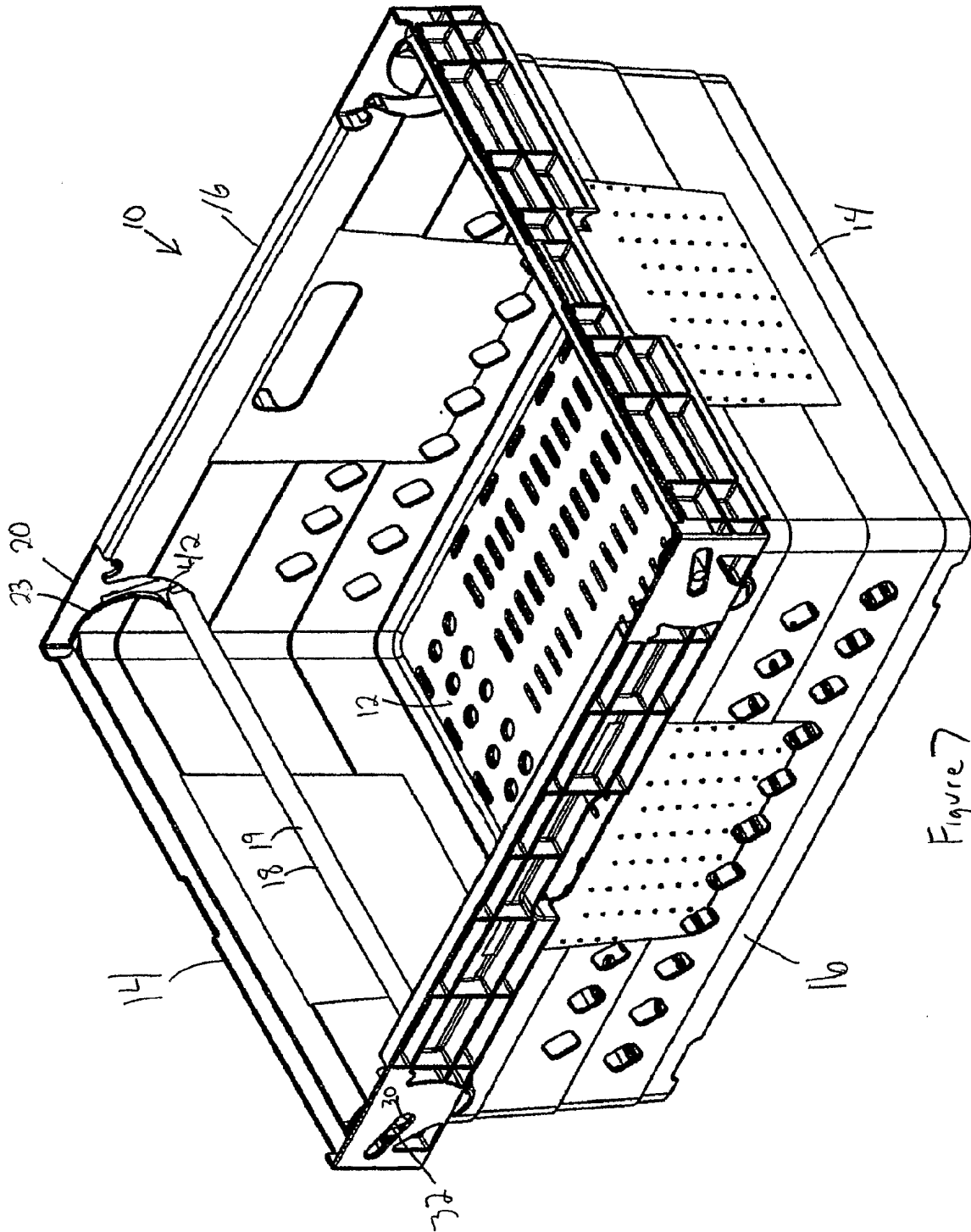


Figure 6





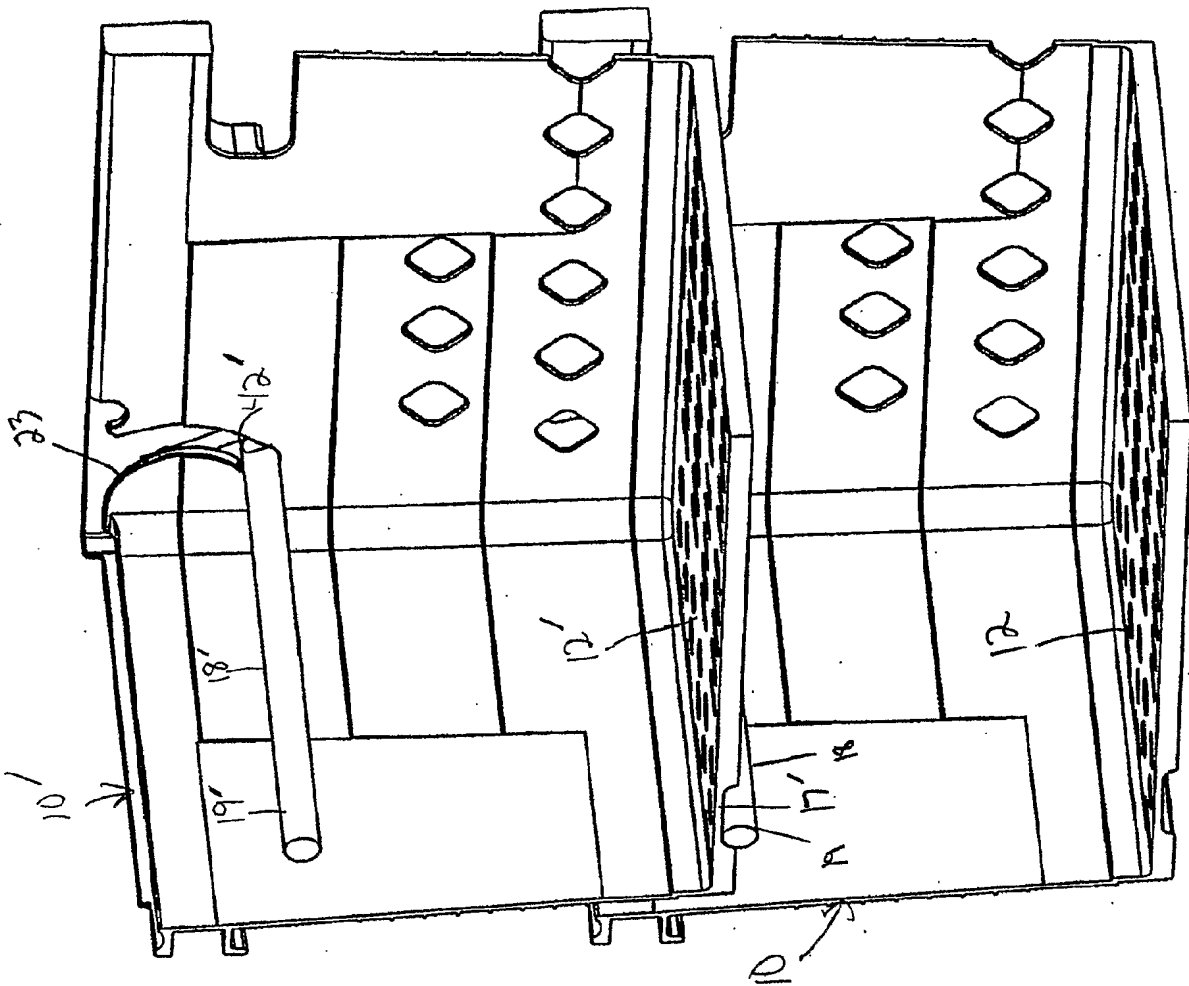


Figure 8

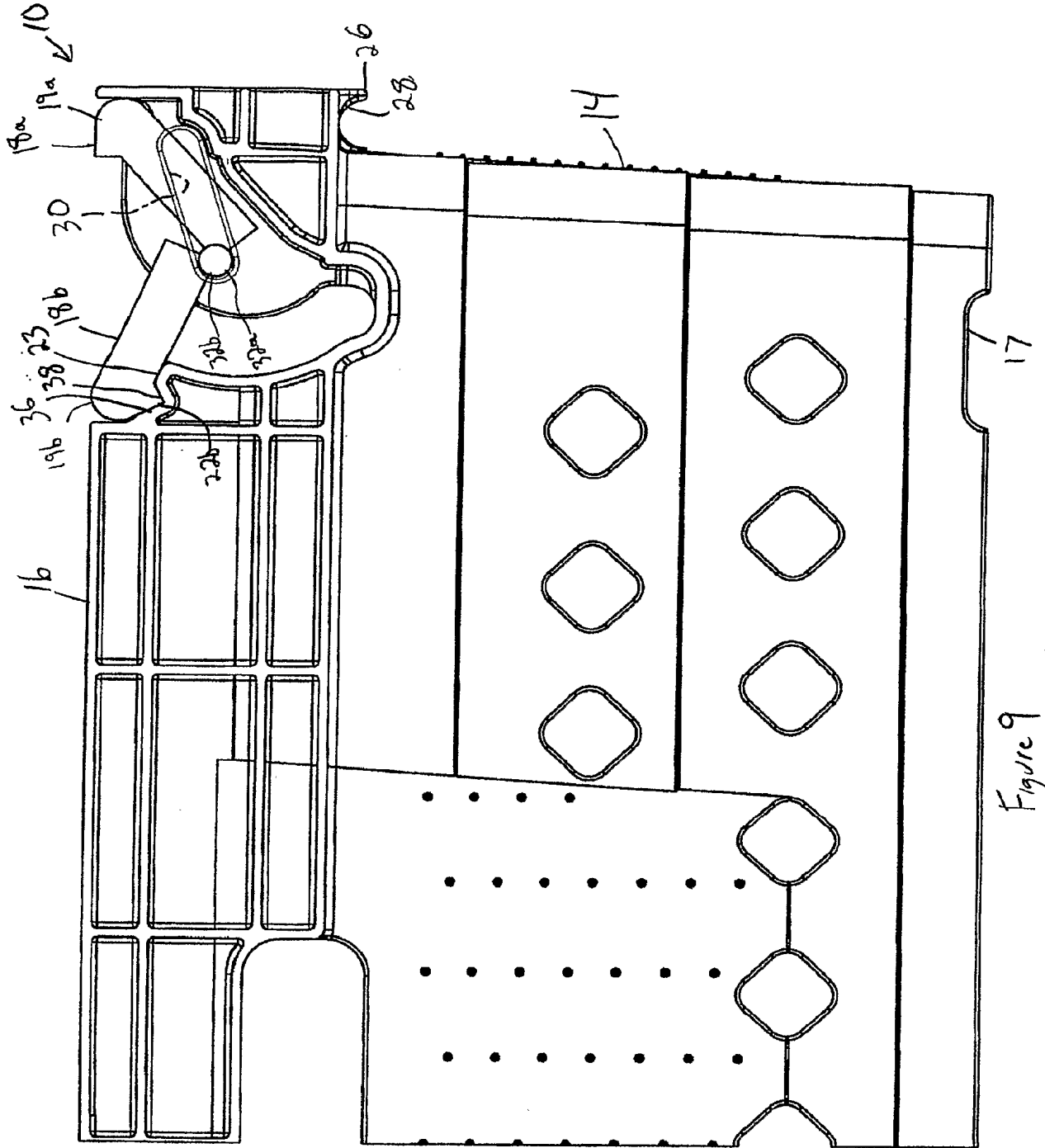


Figure 9

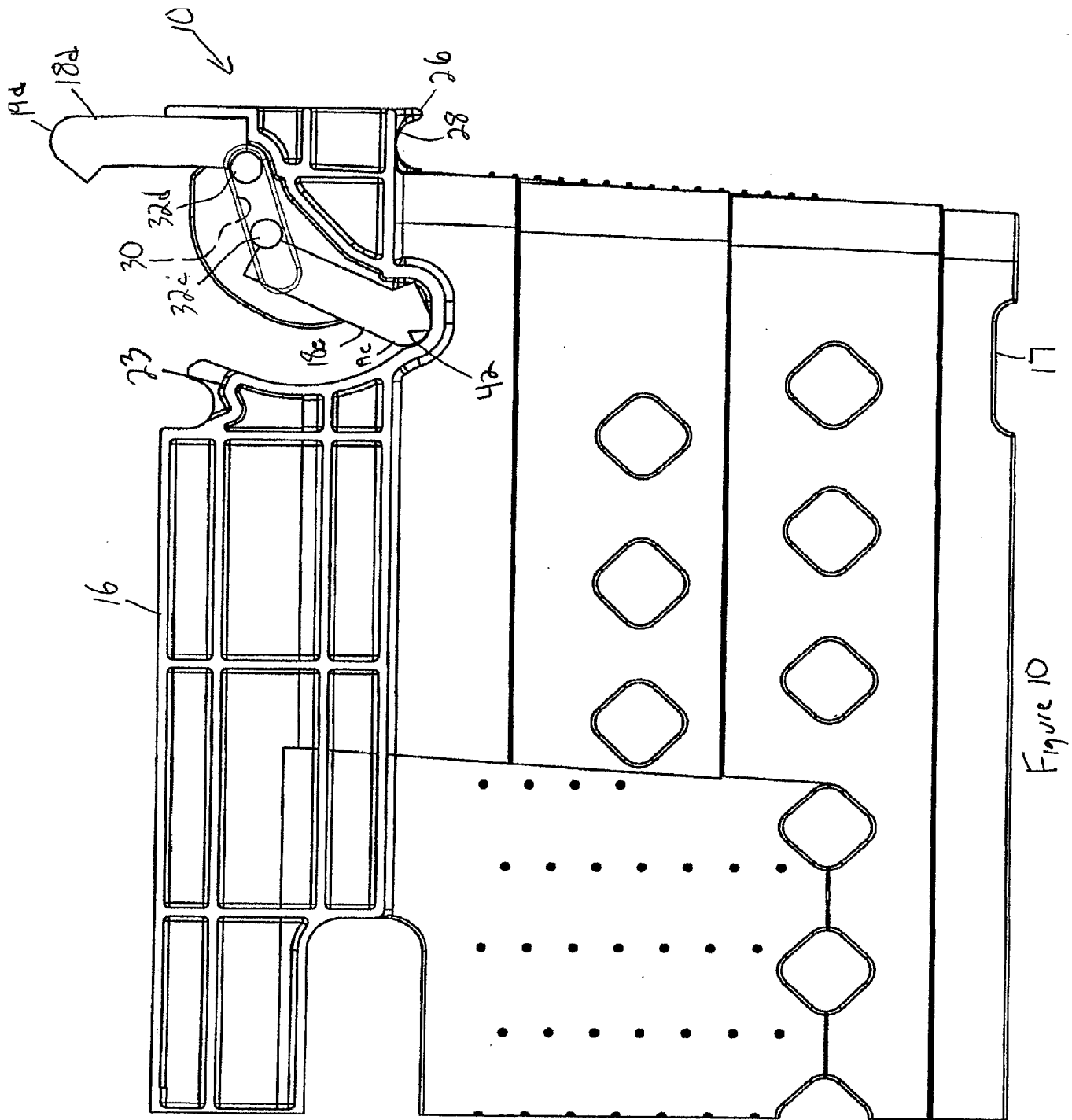


Figure 10

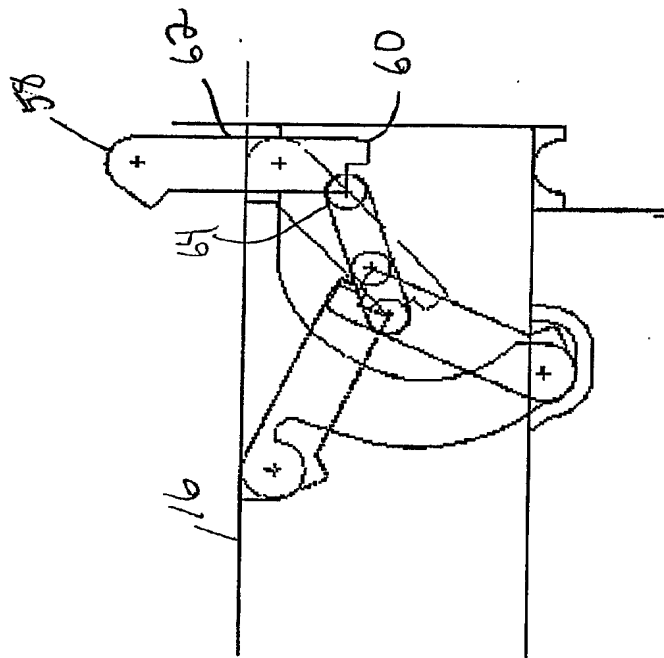


Figure 10a

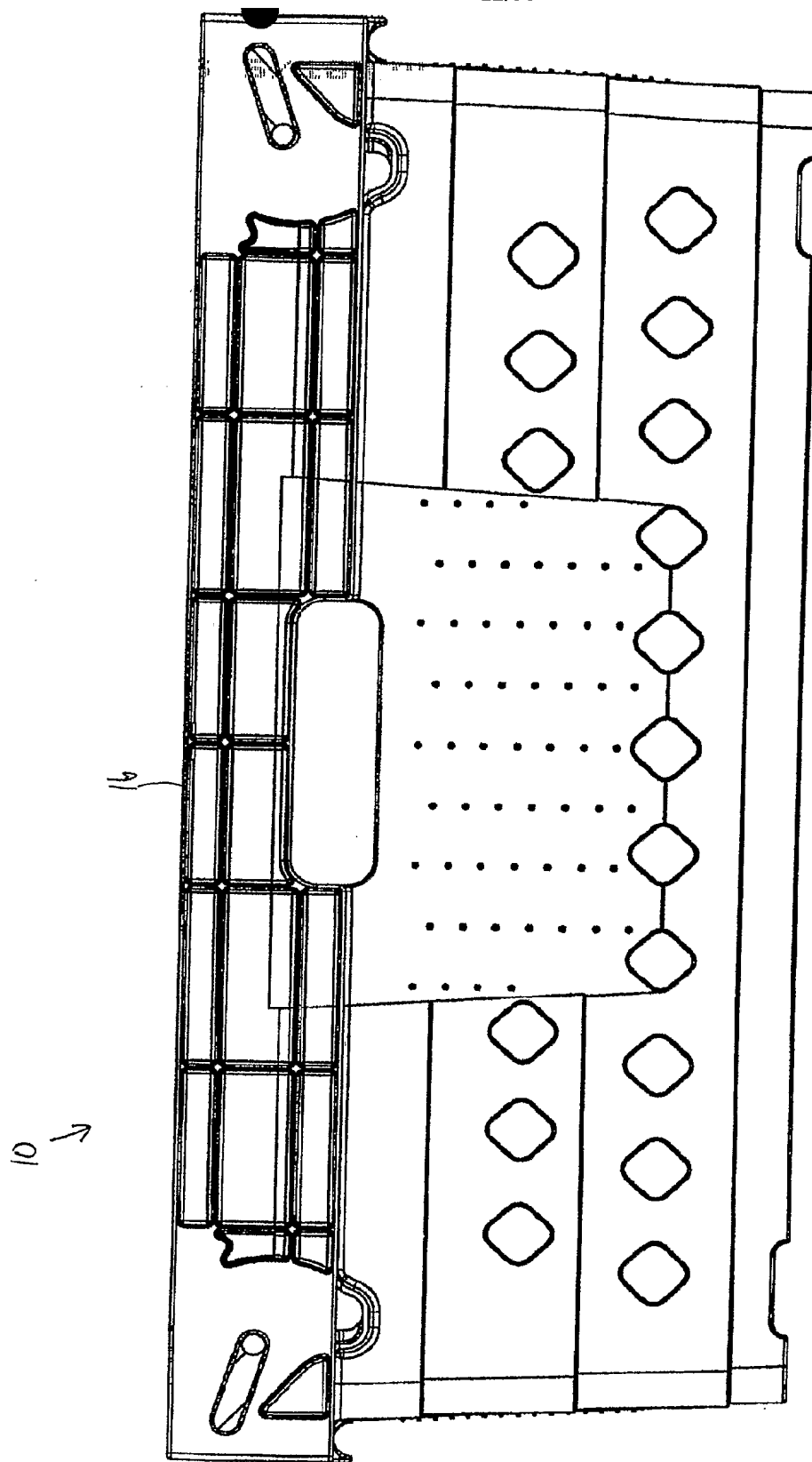


Figure 11

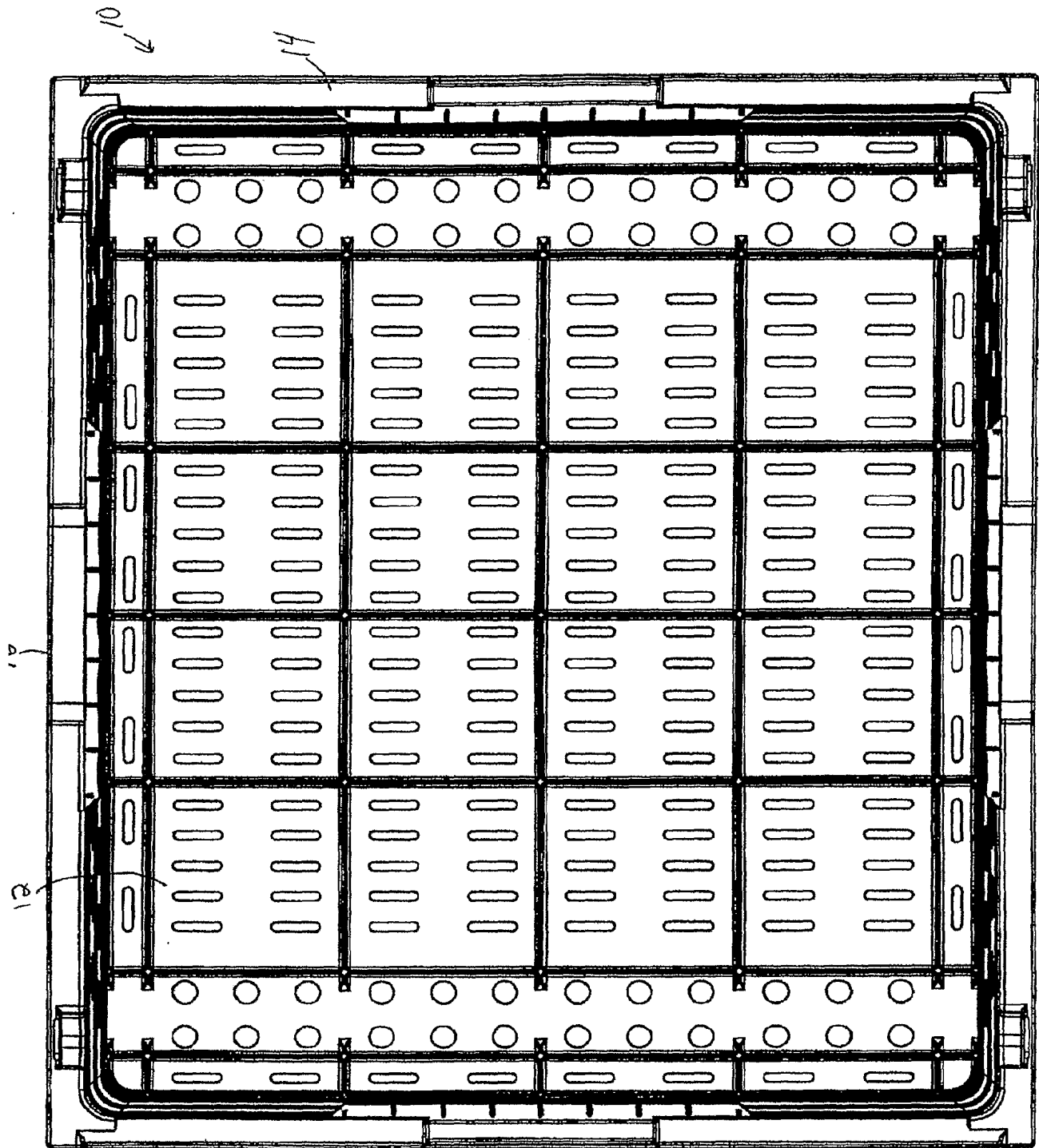


Figure 12

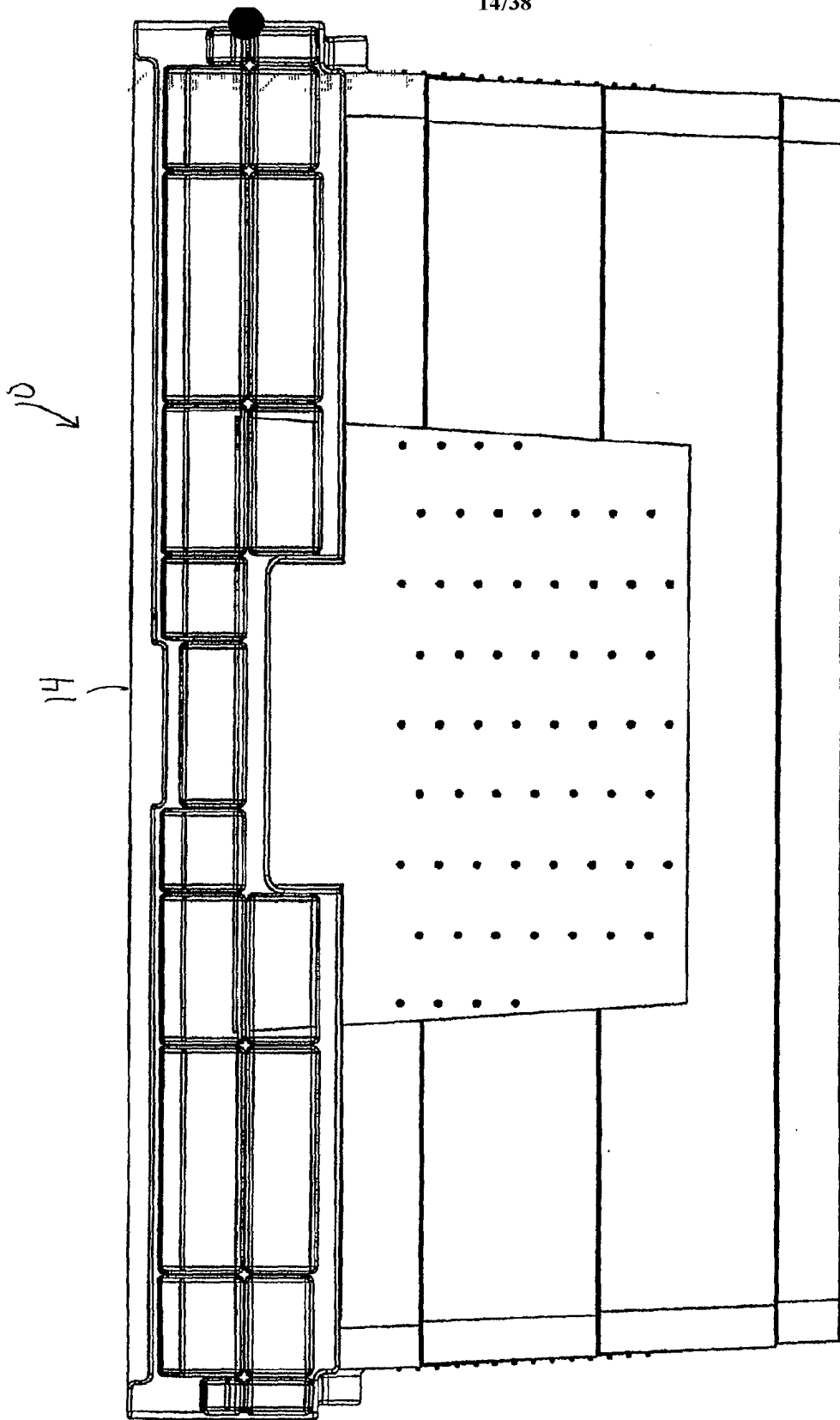


Figure 13

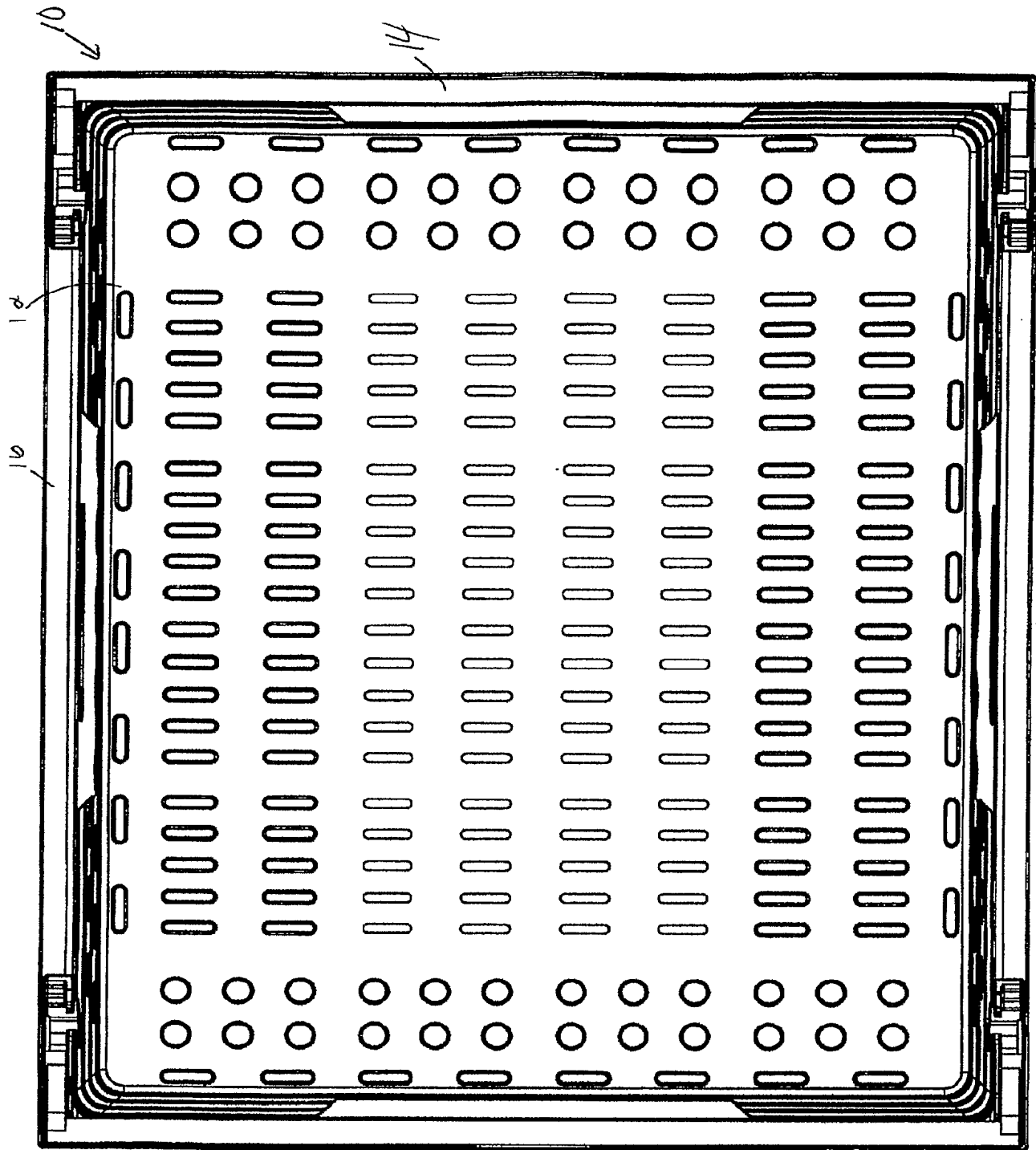


Figure 14



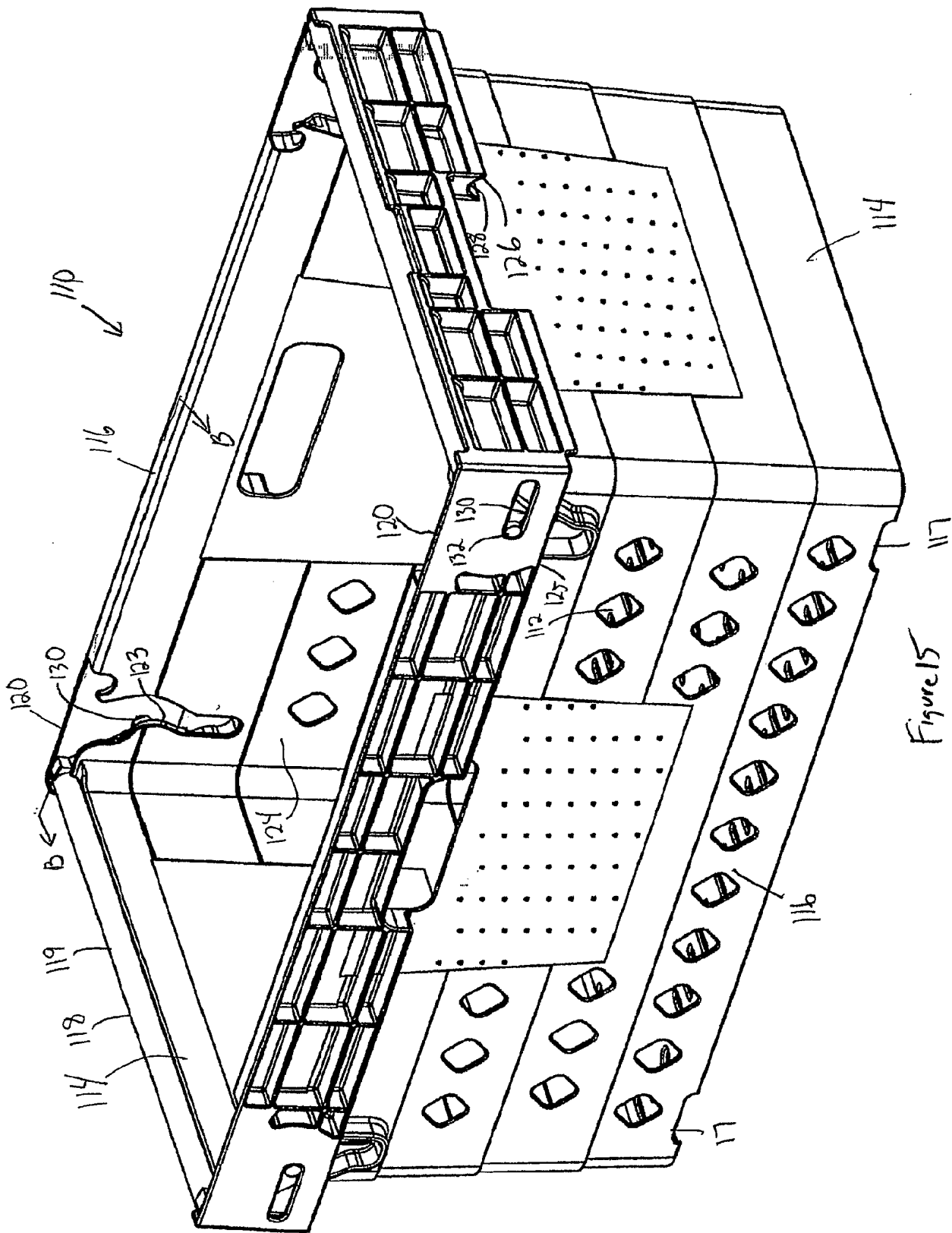
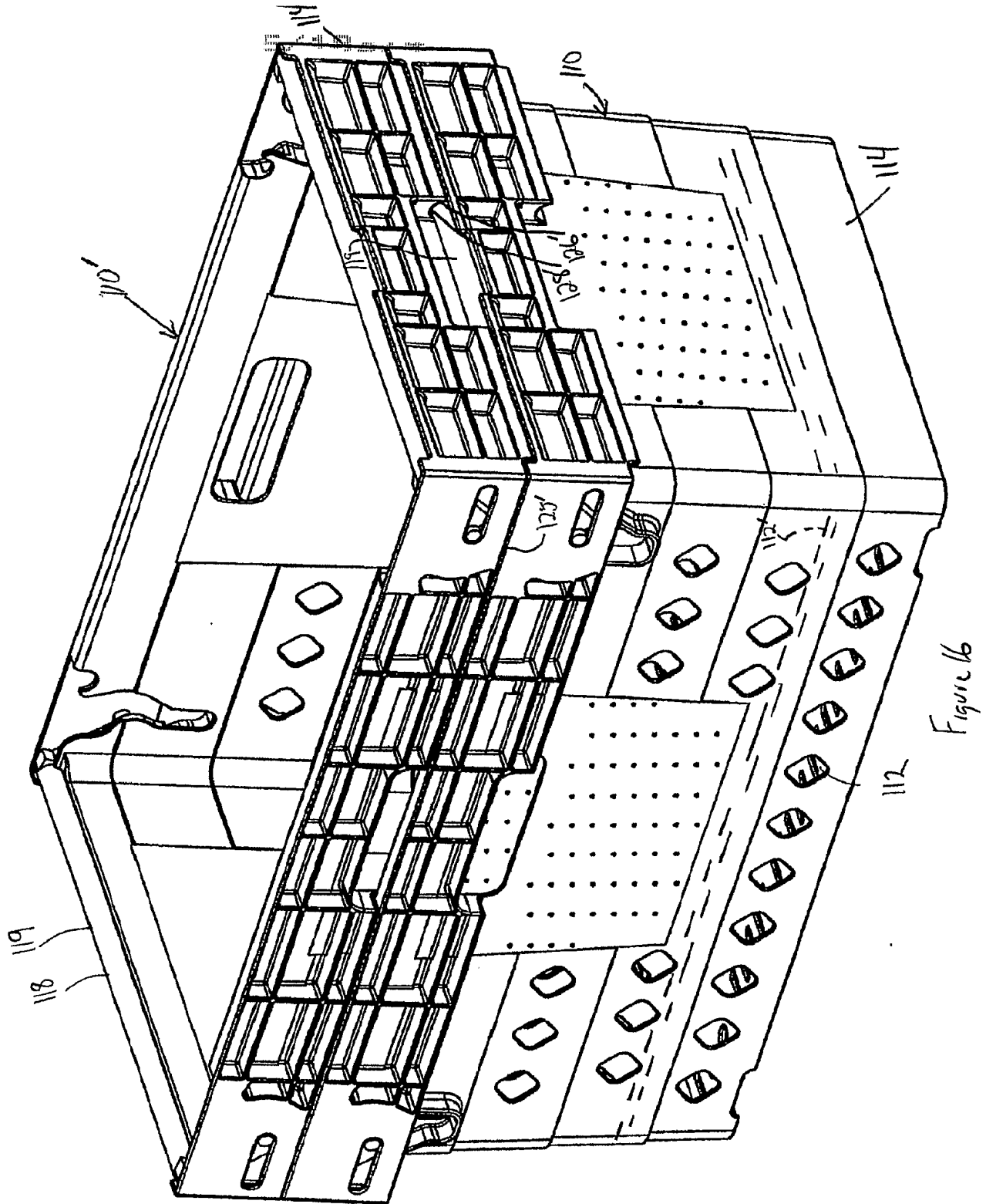
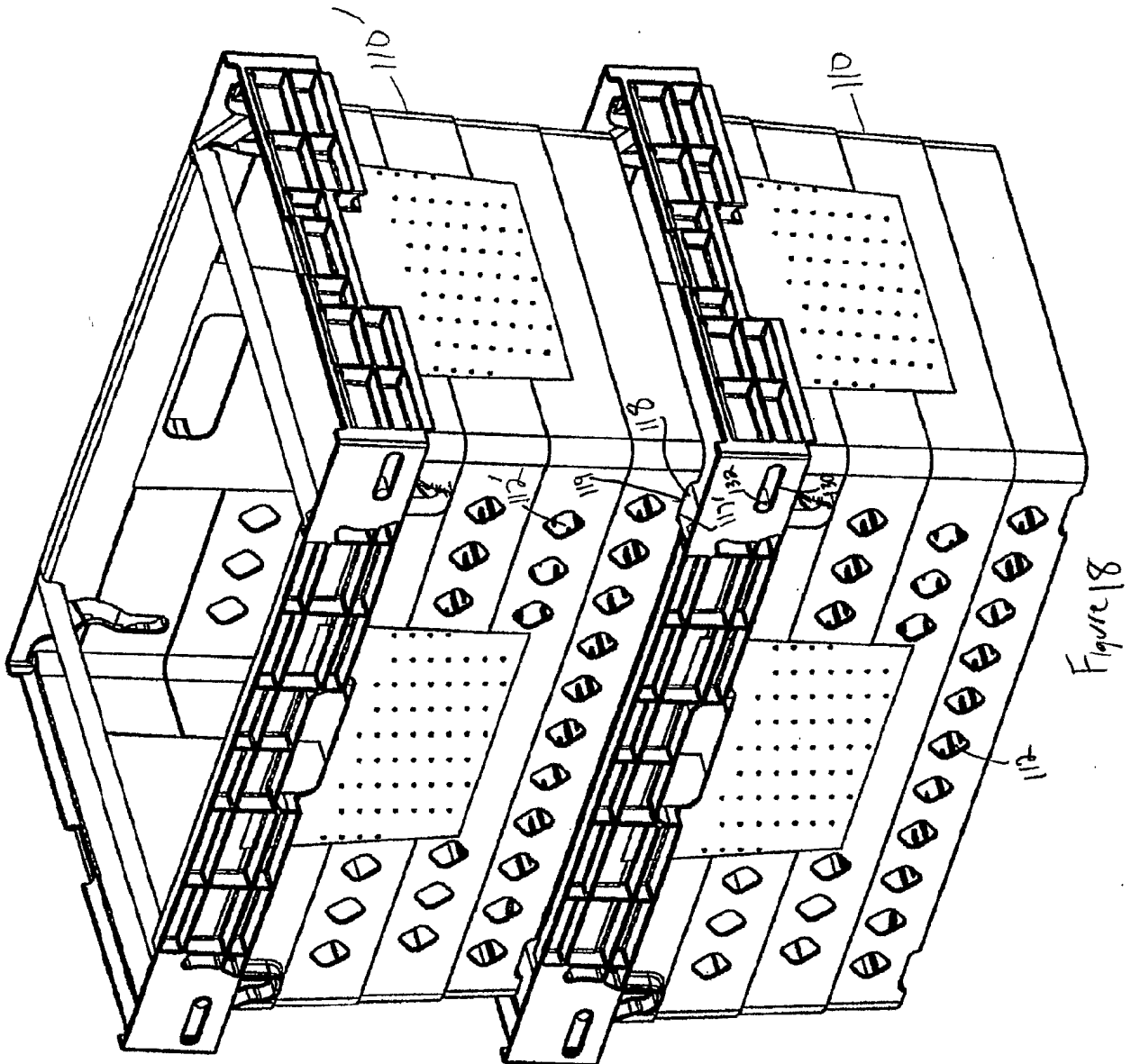


Figure 15







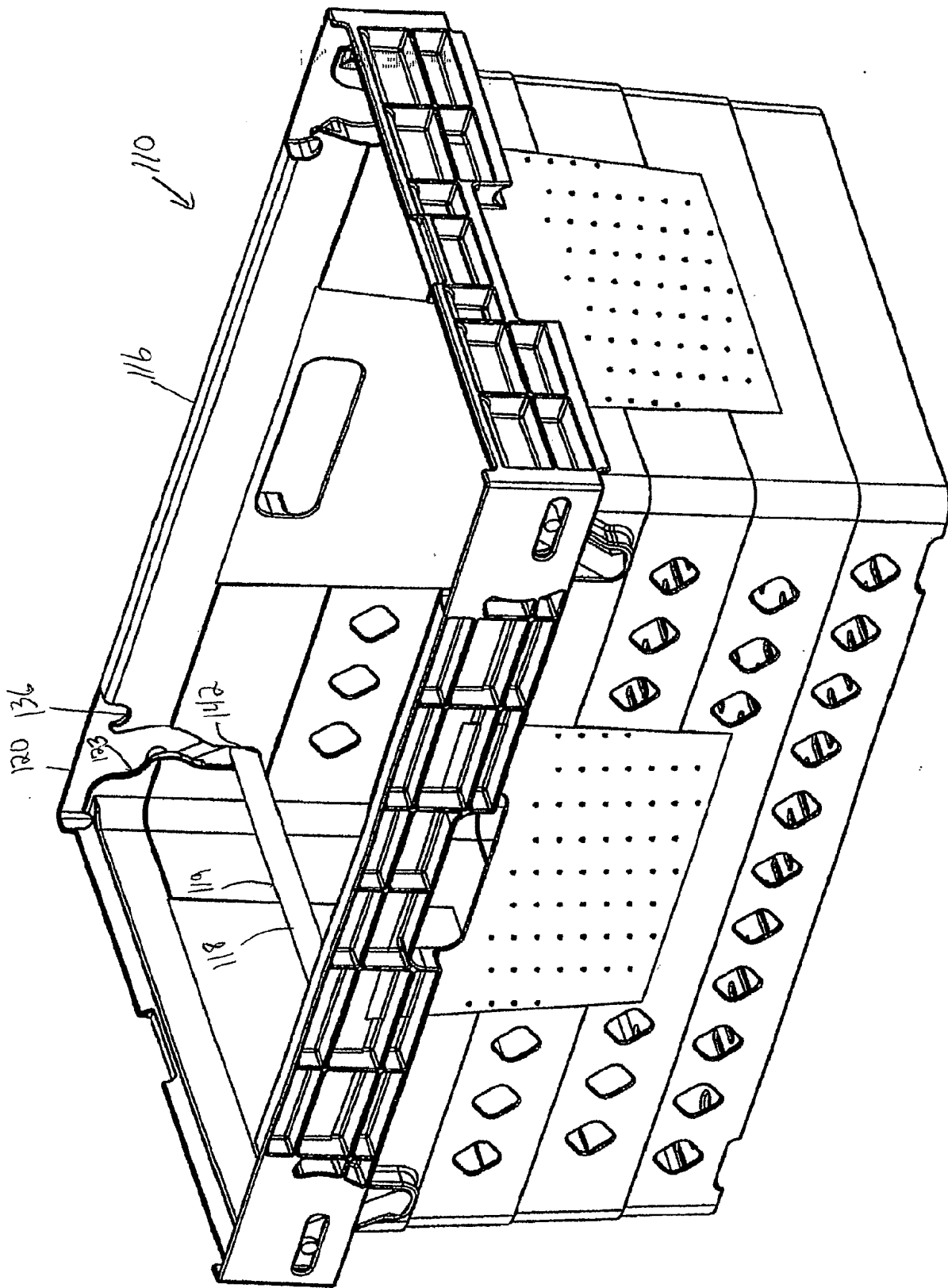


Figure 19

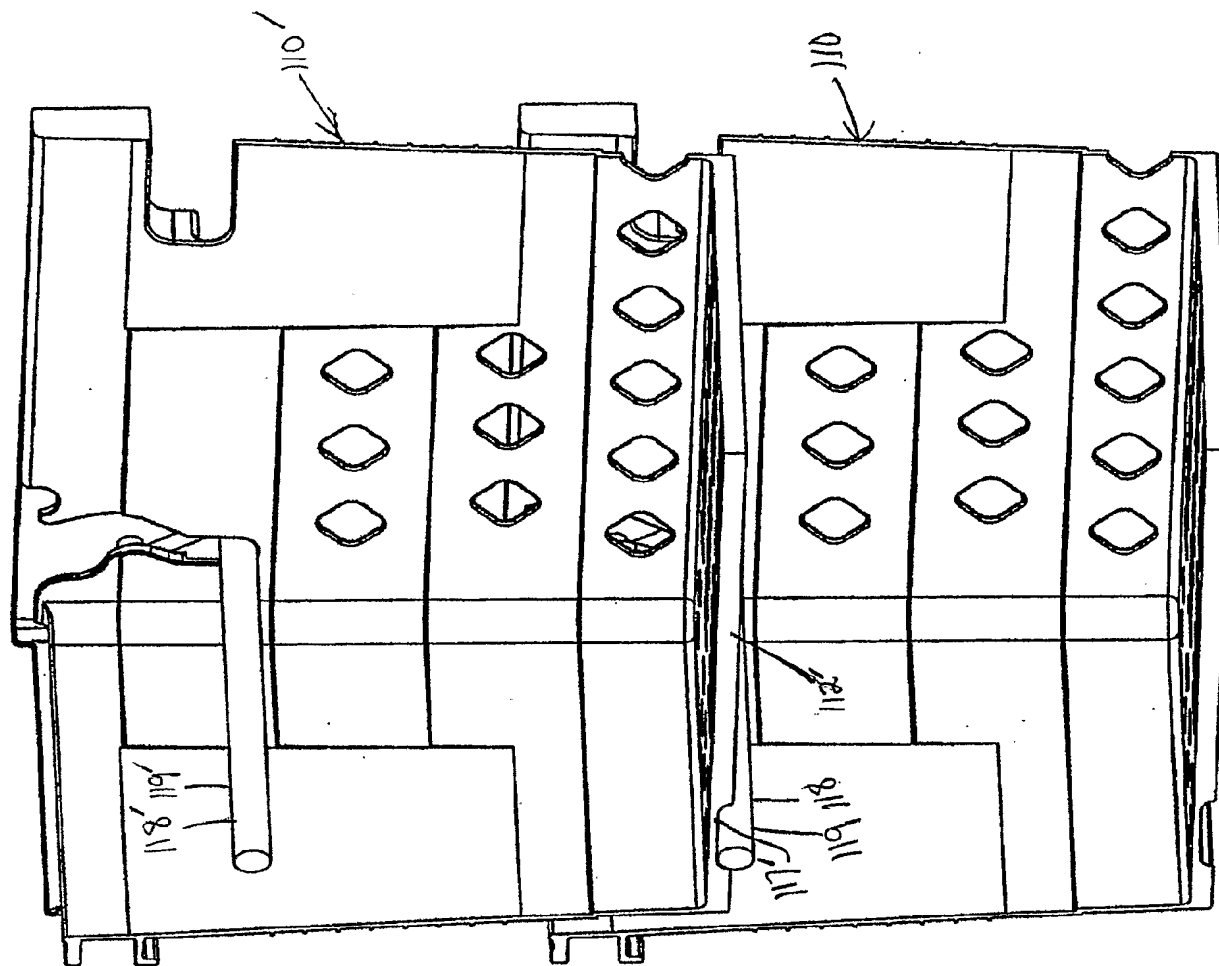
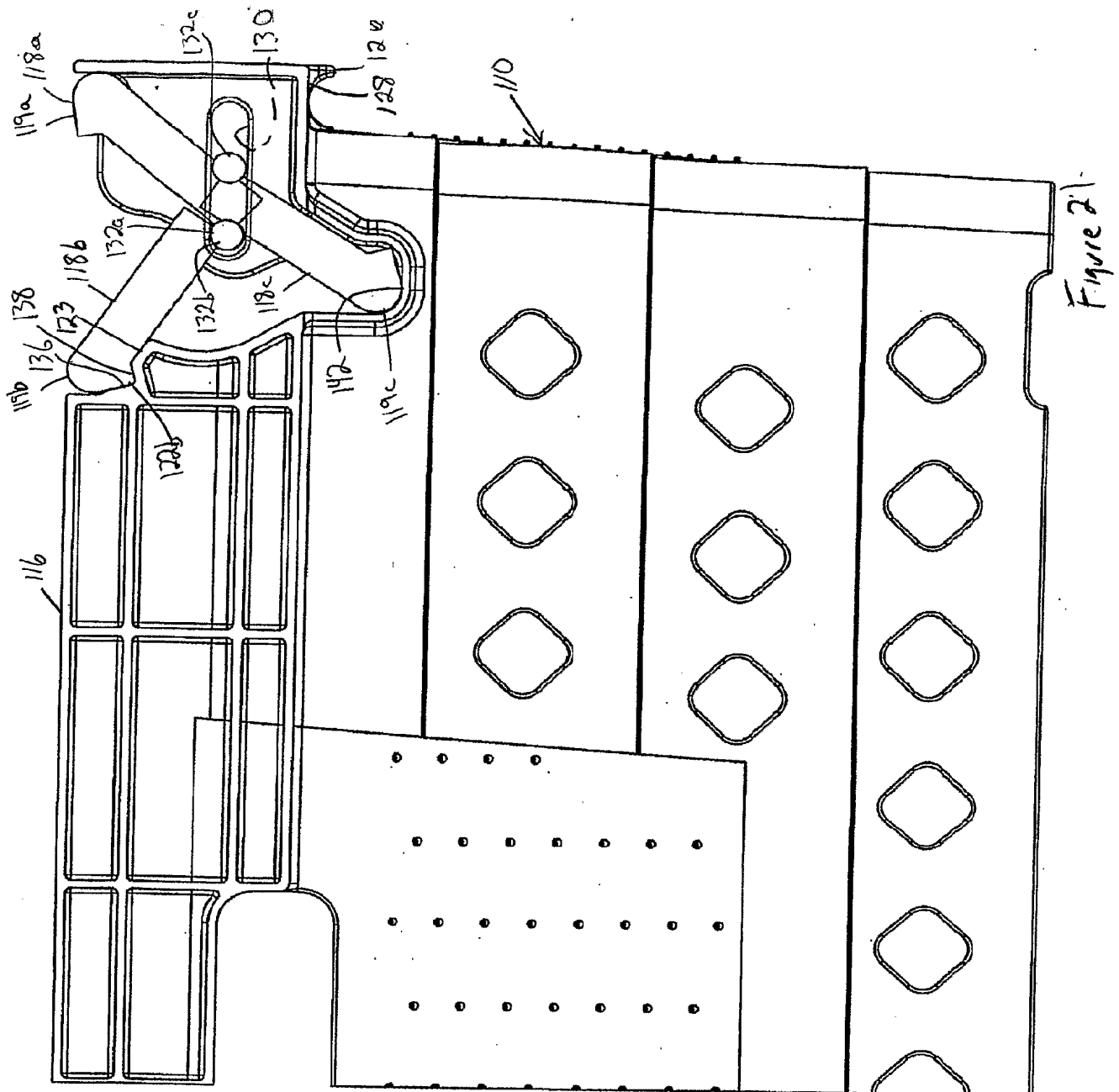


Figure 20



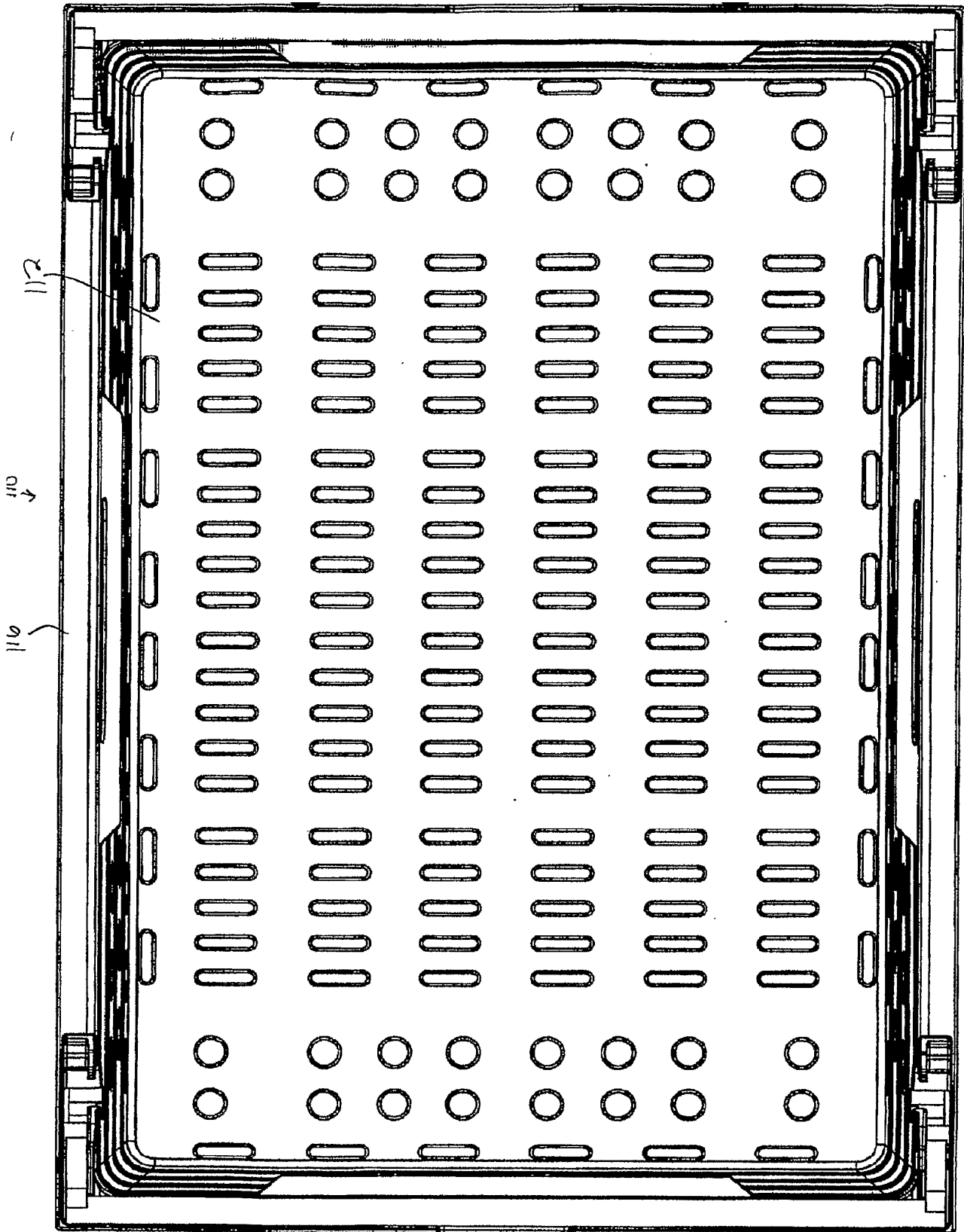


Figure 22



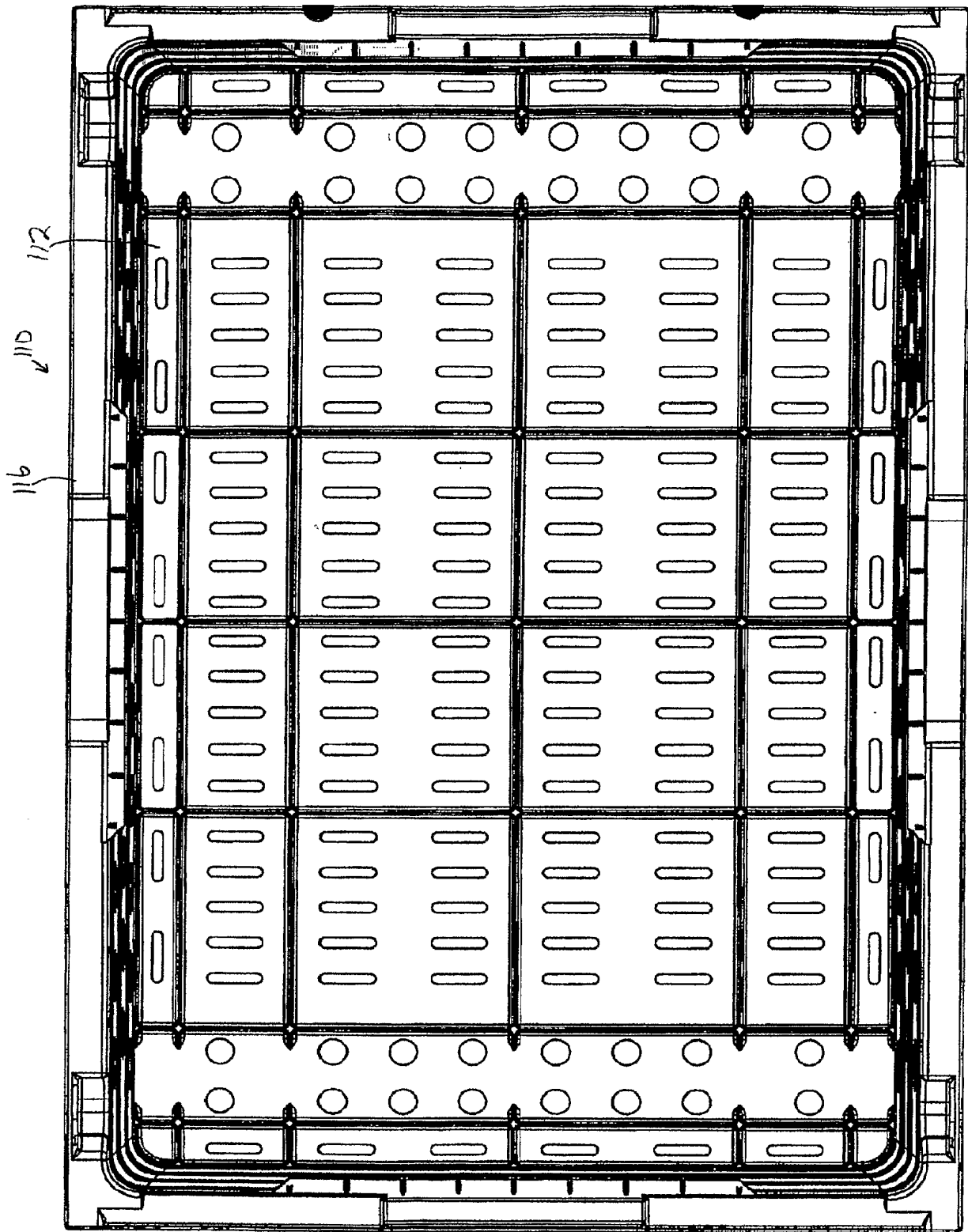


Figure 23

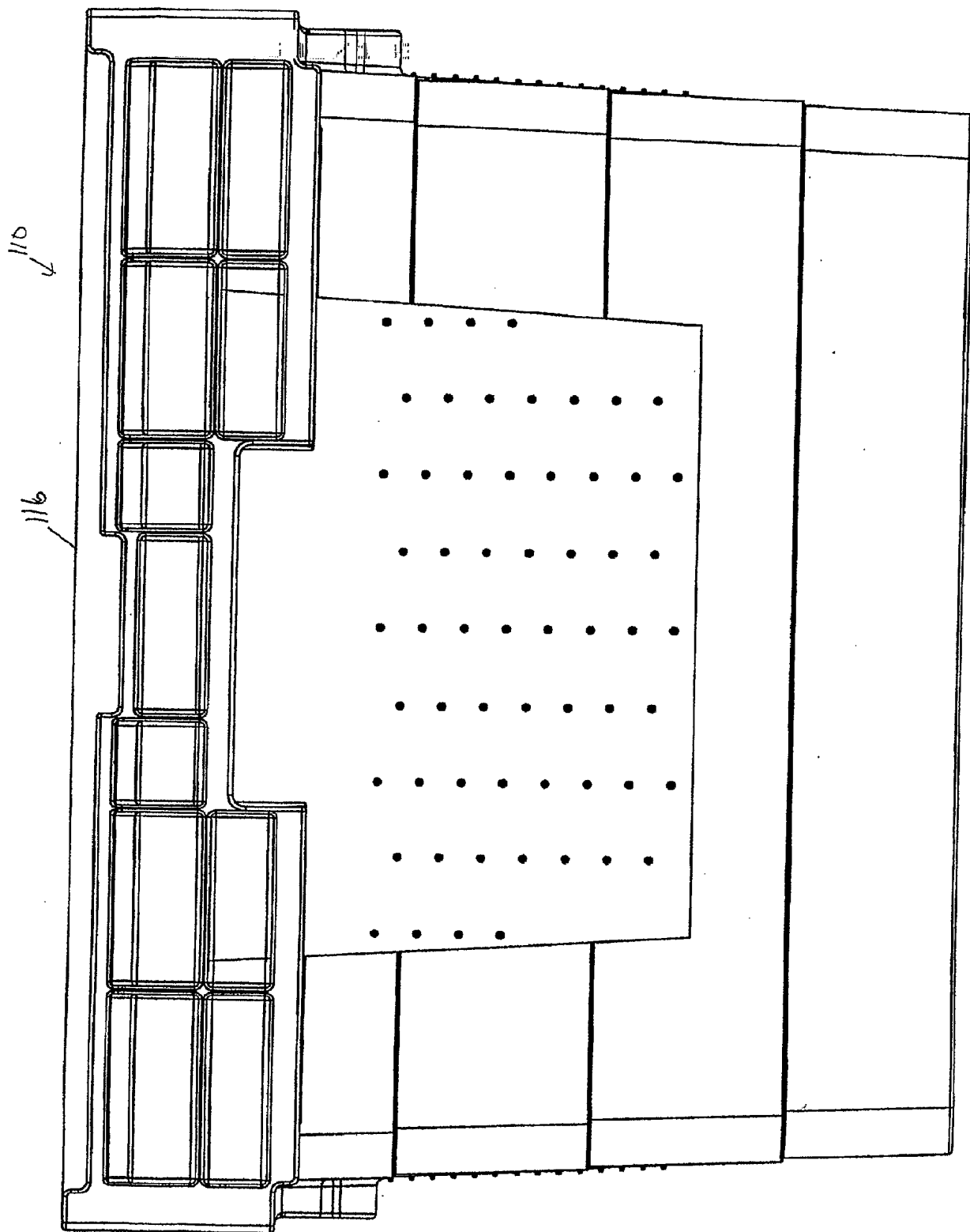


Figure 4

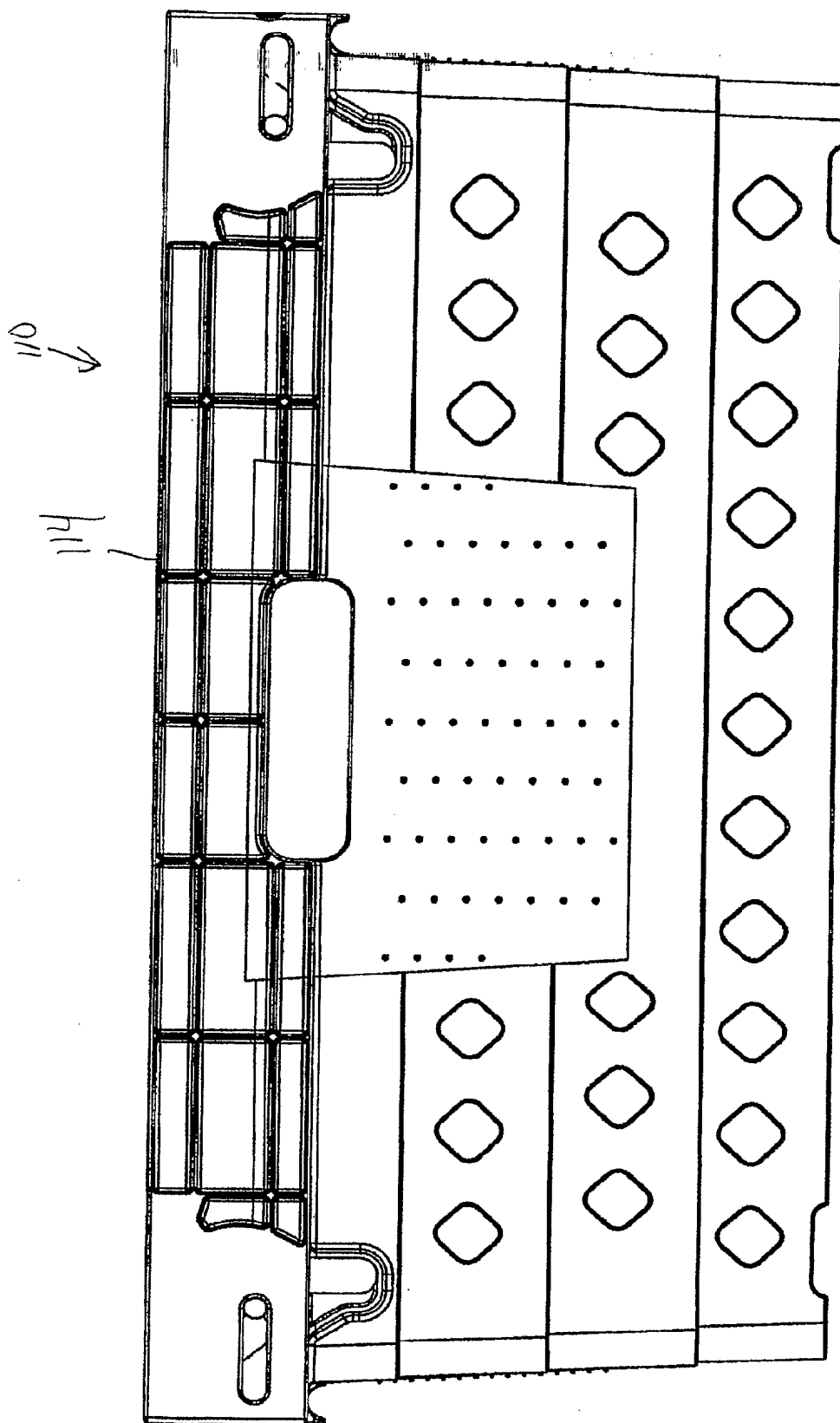


Figure 25

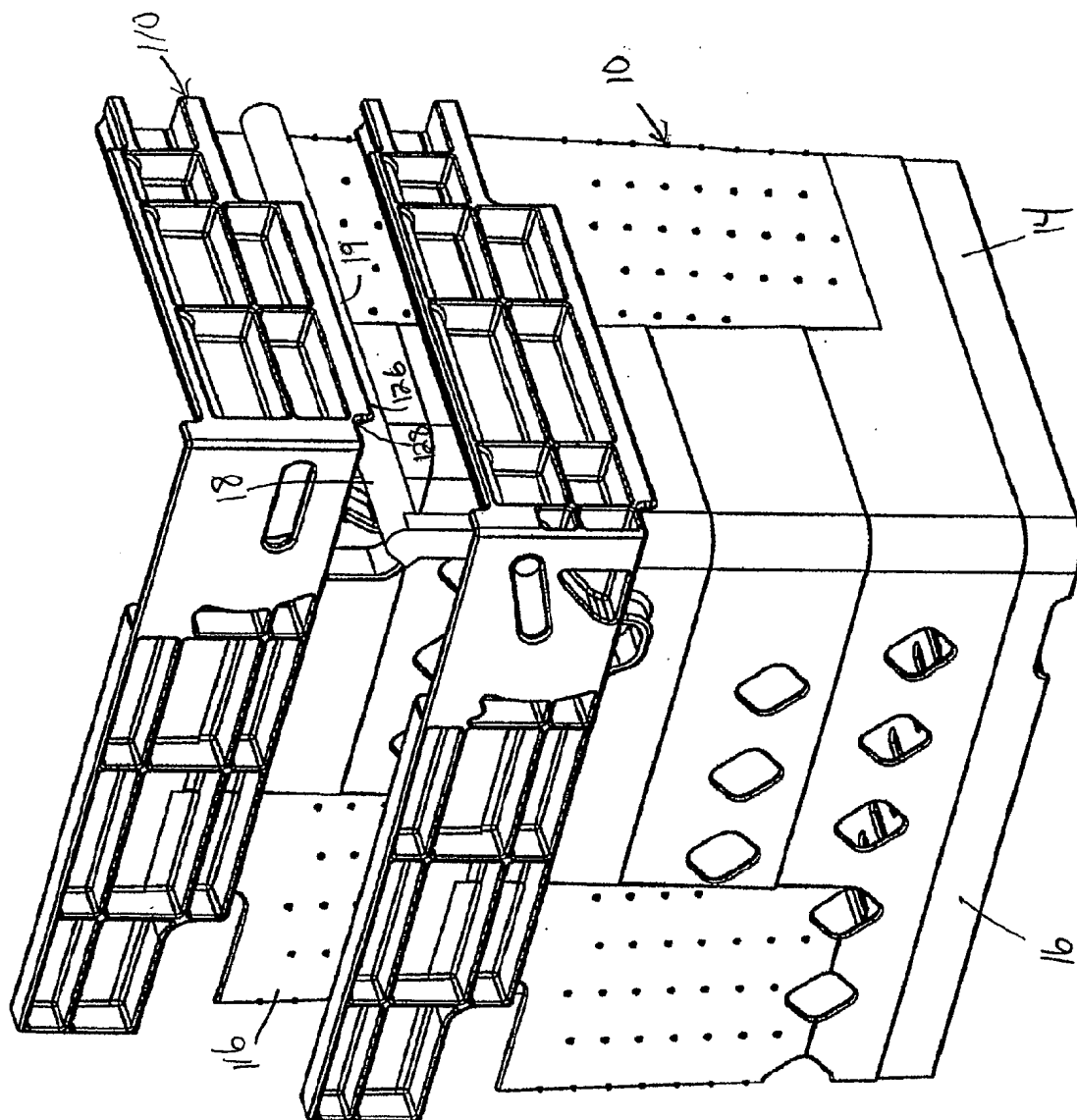


Figure 2b

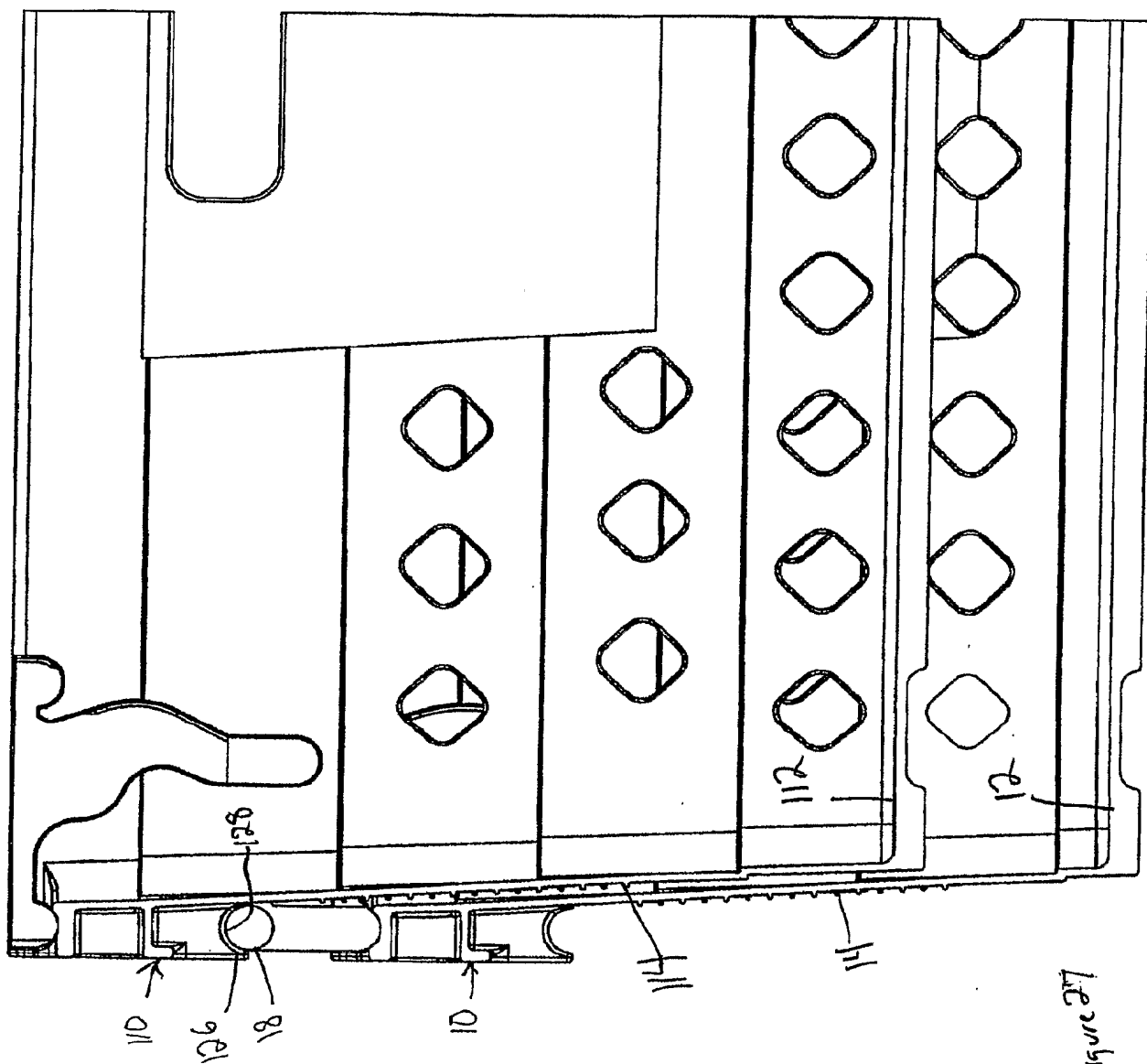


Figure 27

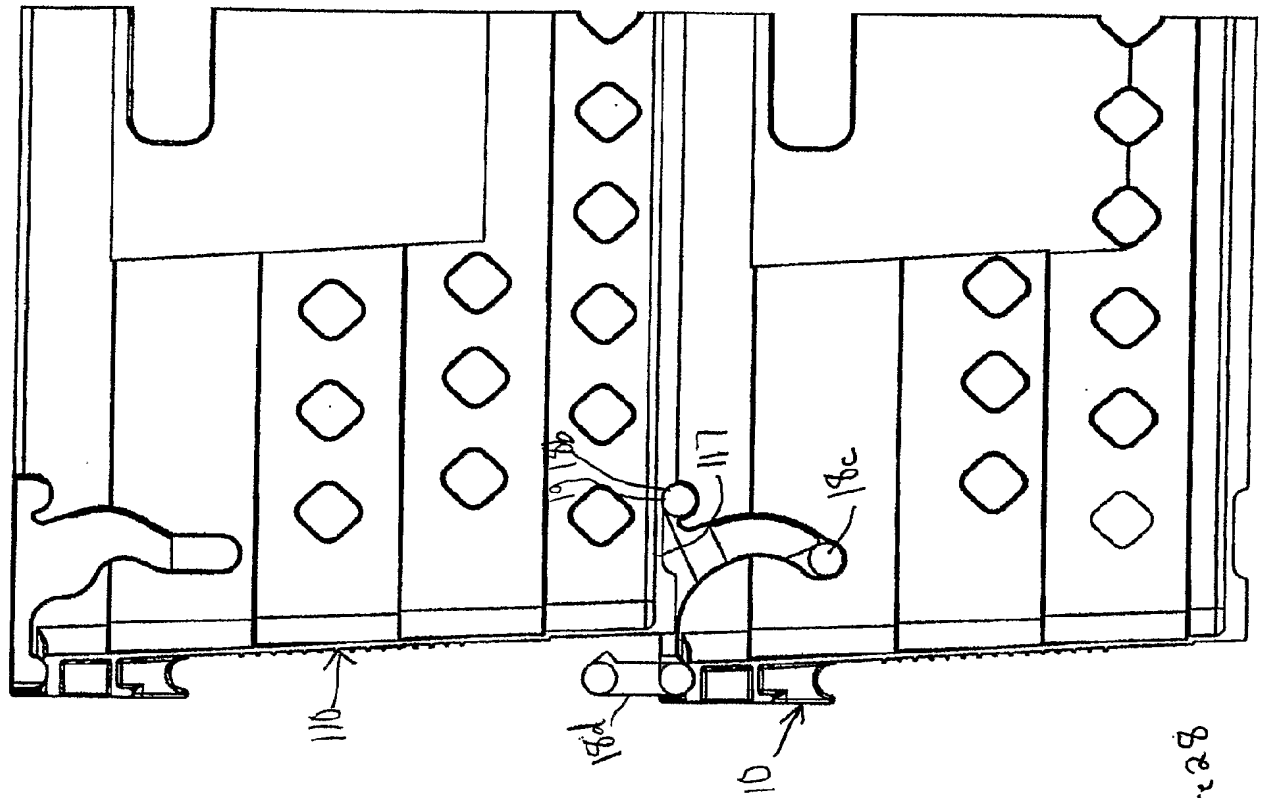


Figure 28

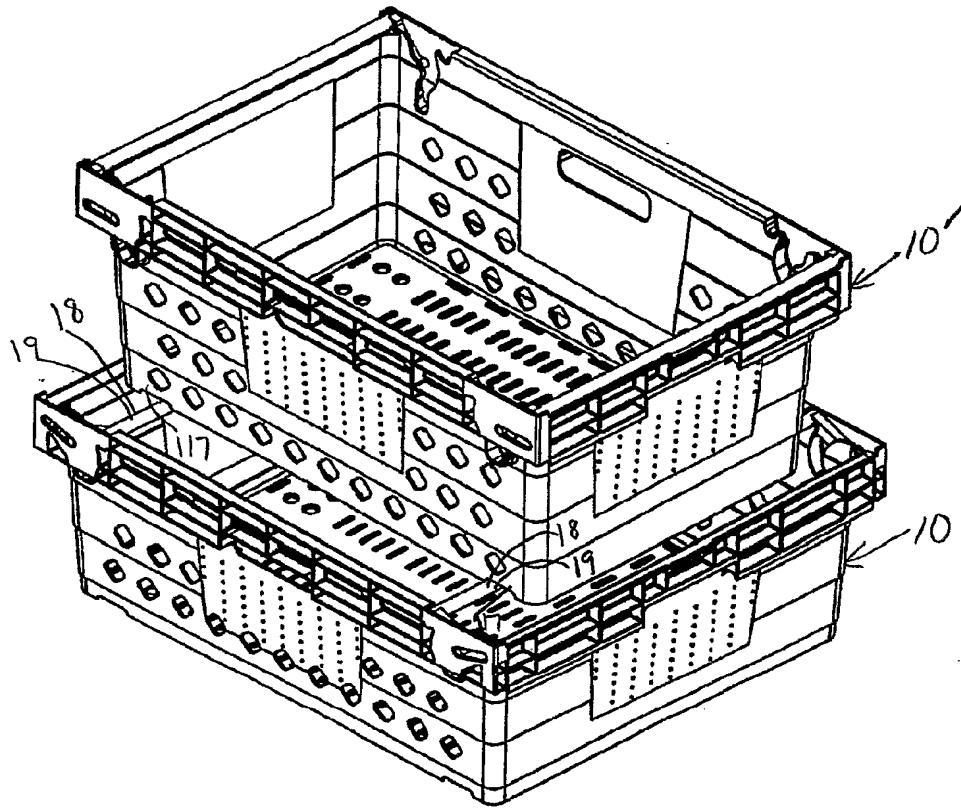
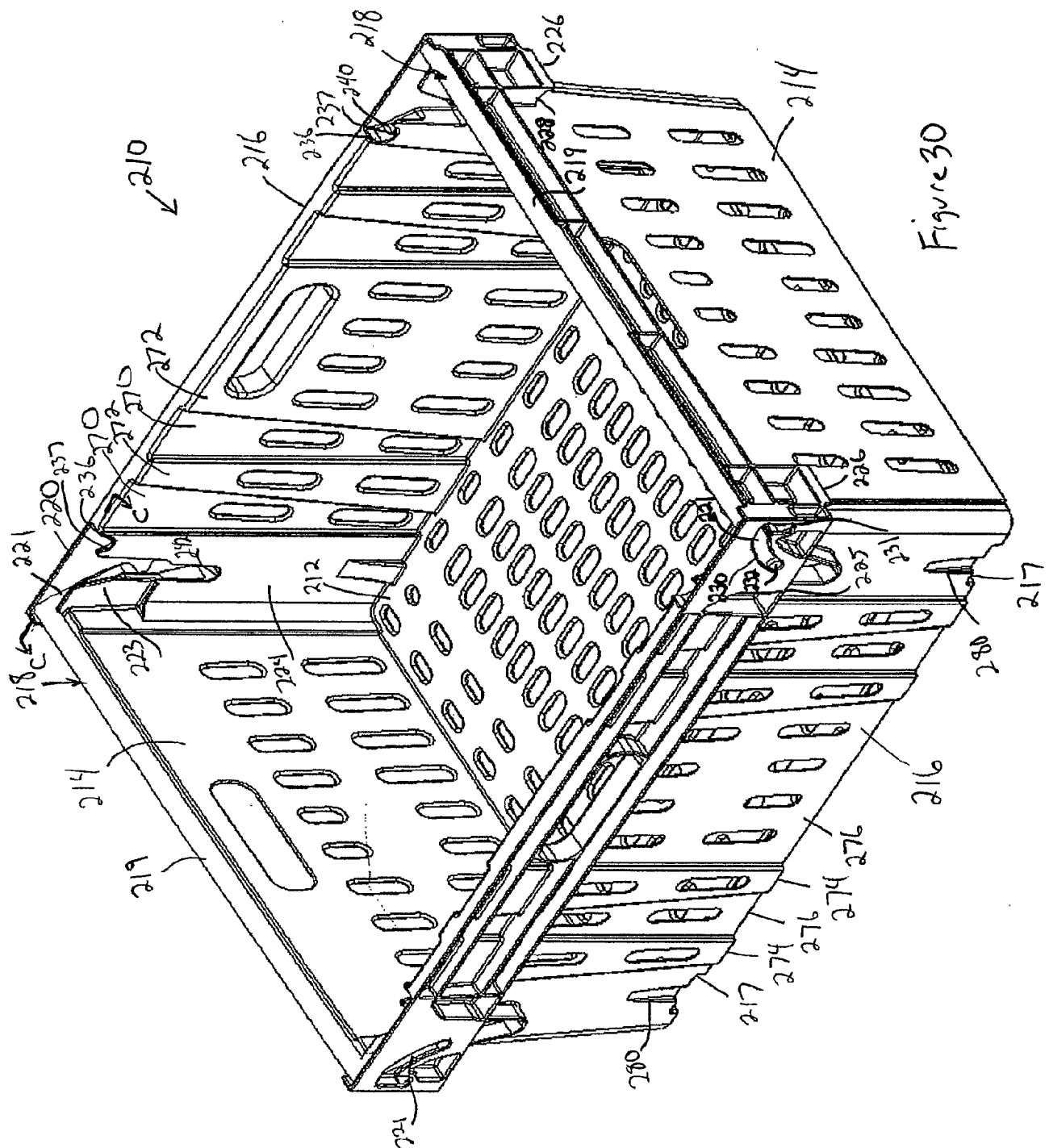


Figure 29





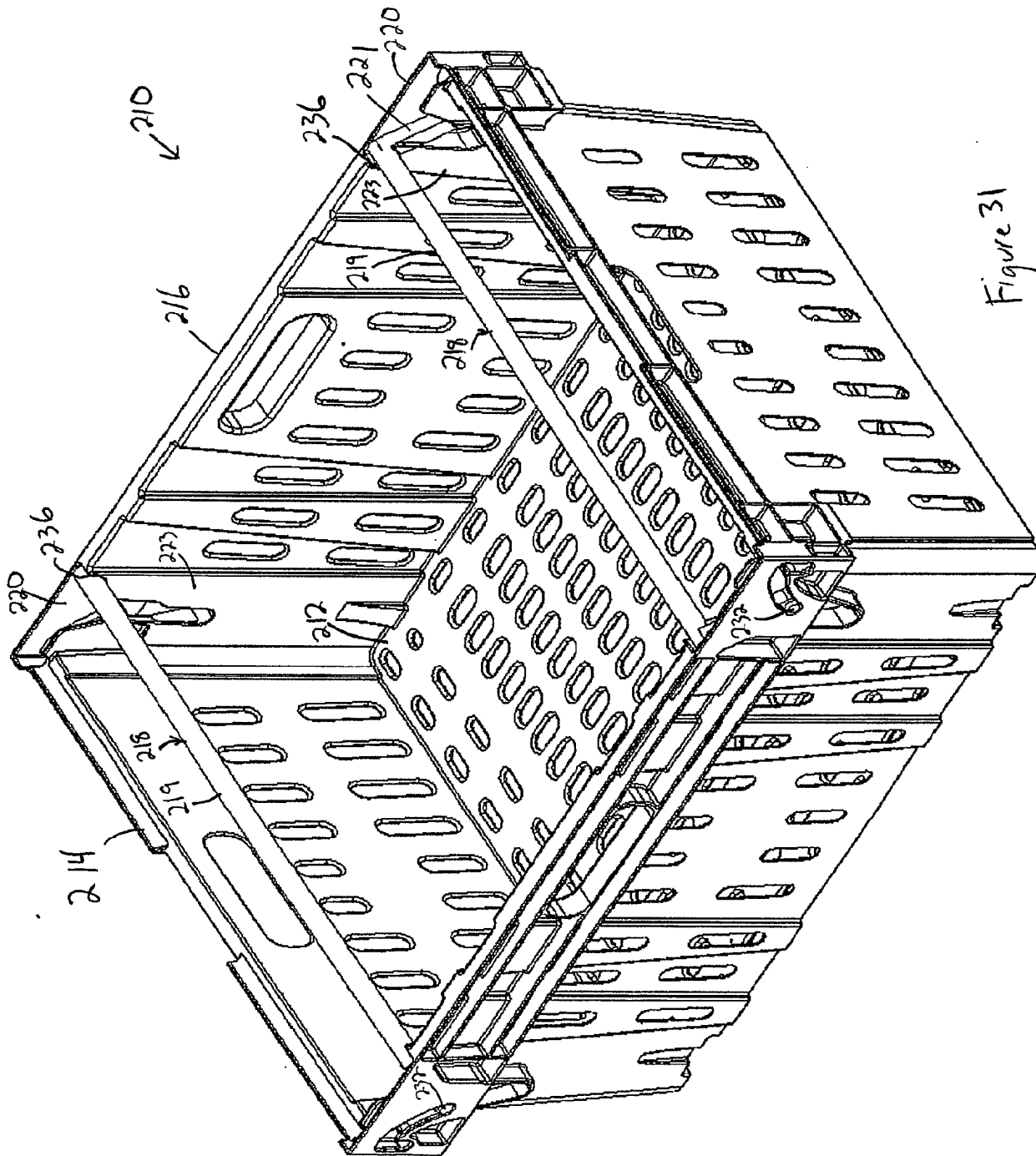
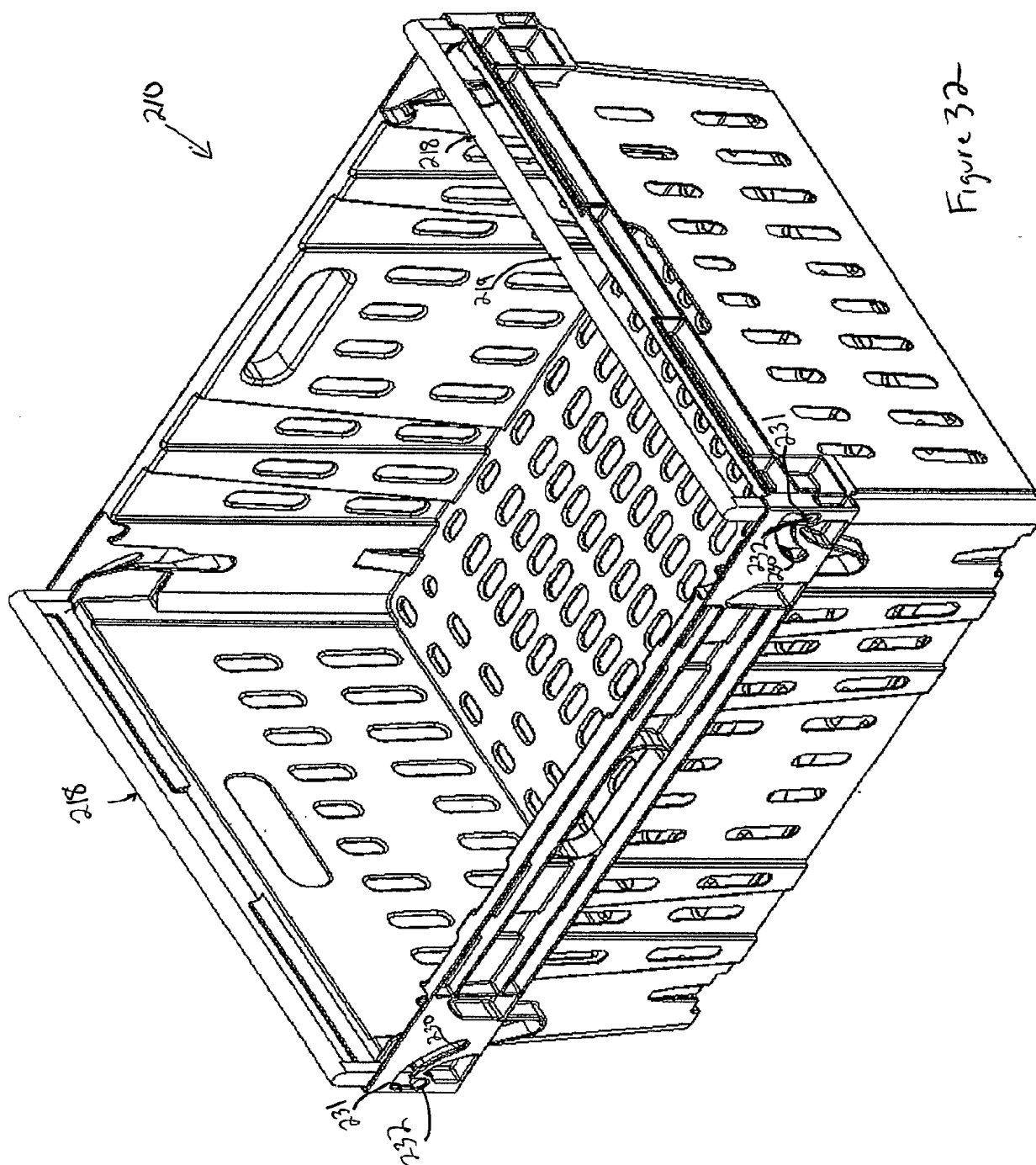


Figure 31



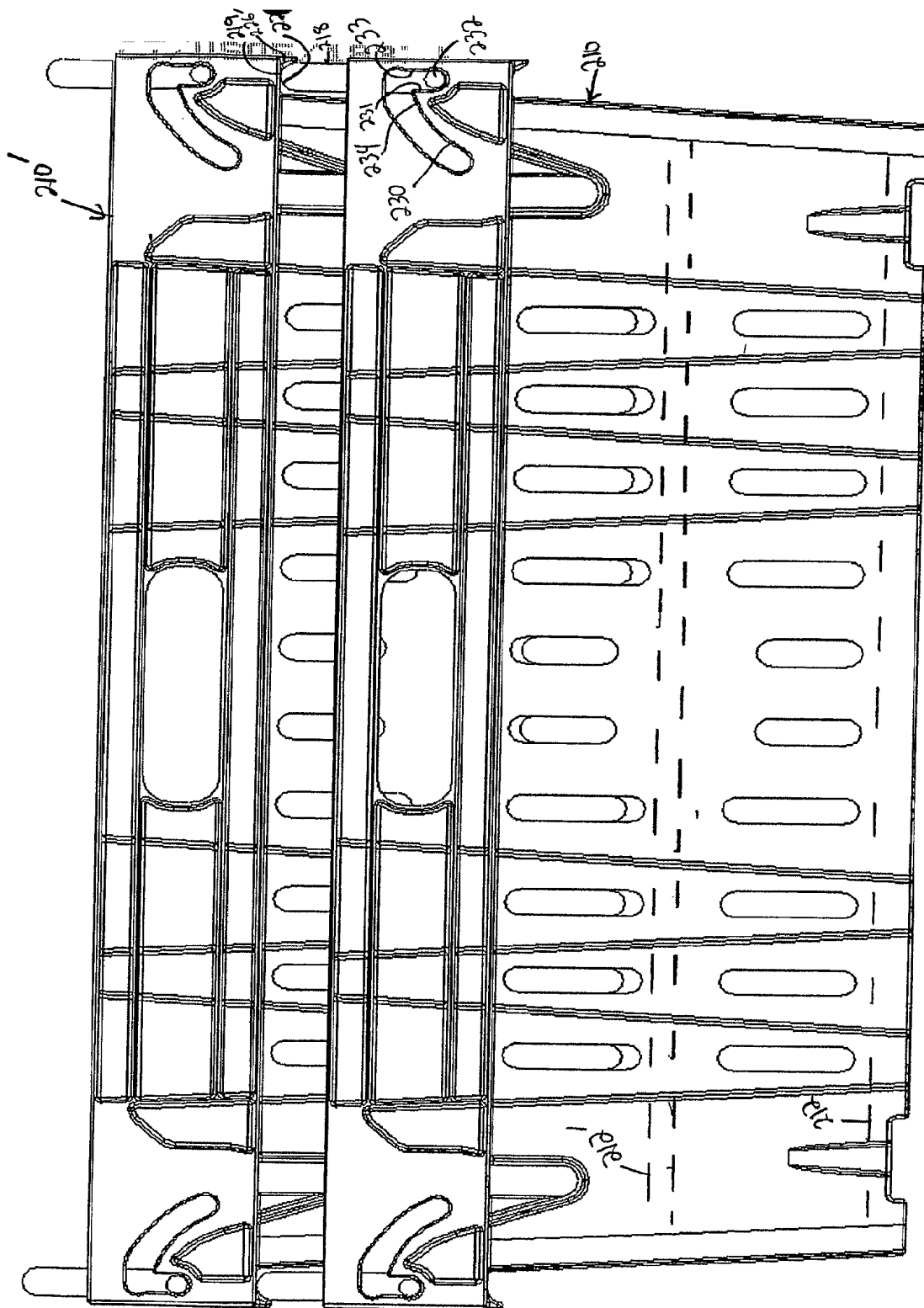


Figure 33

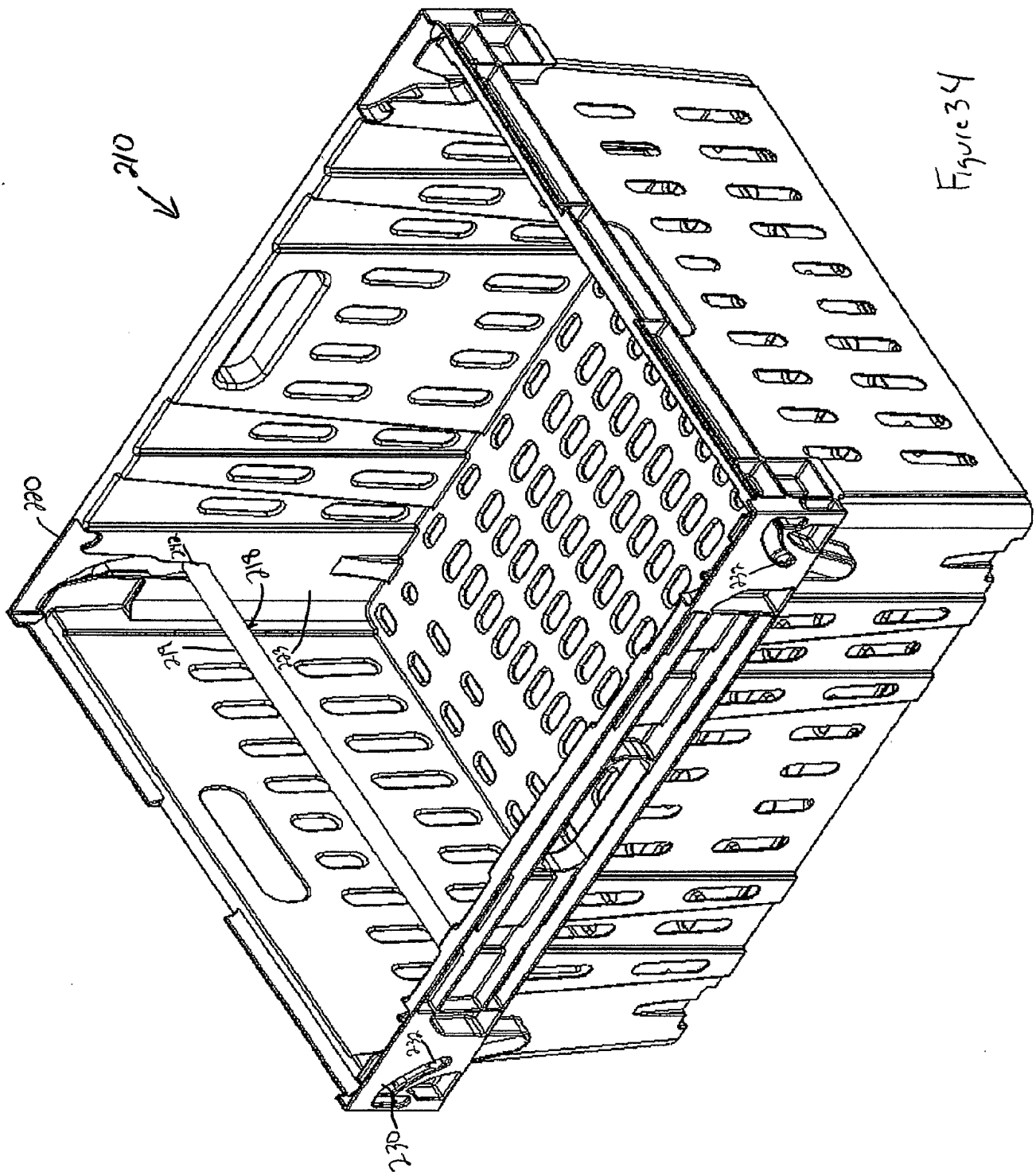


Figure 34

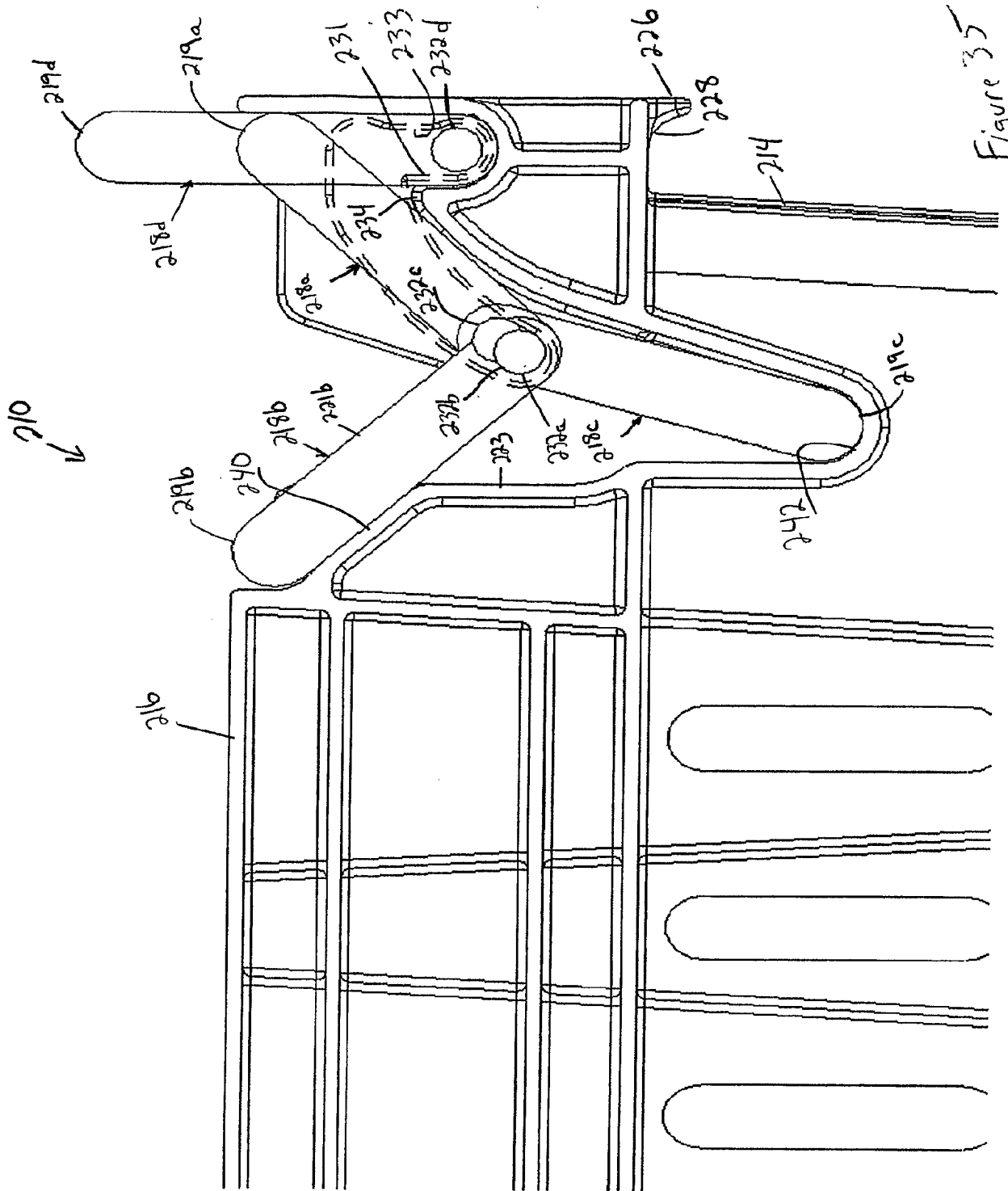
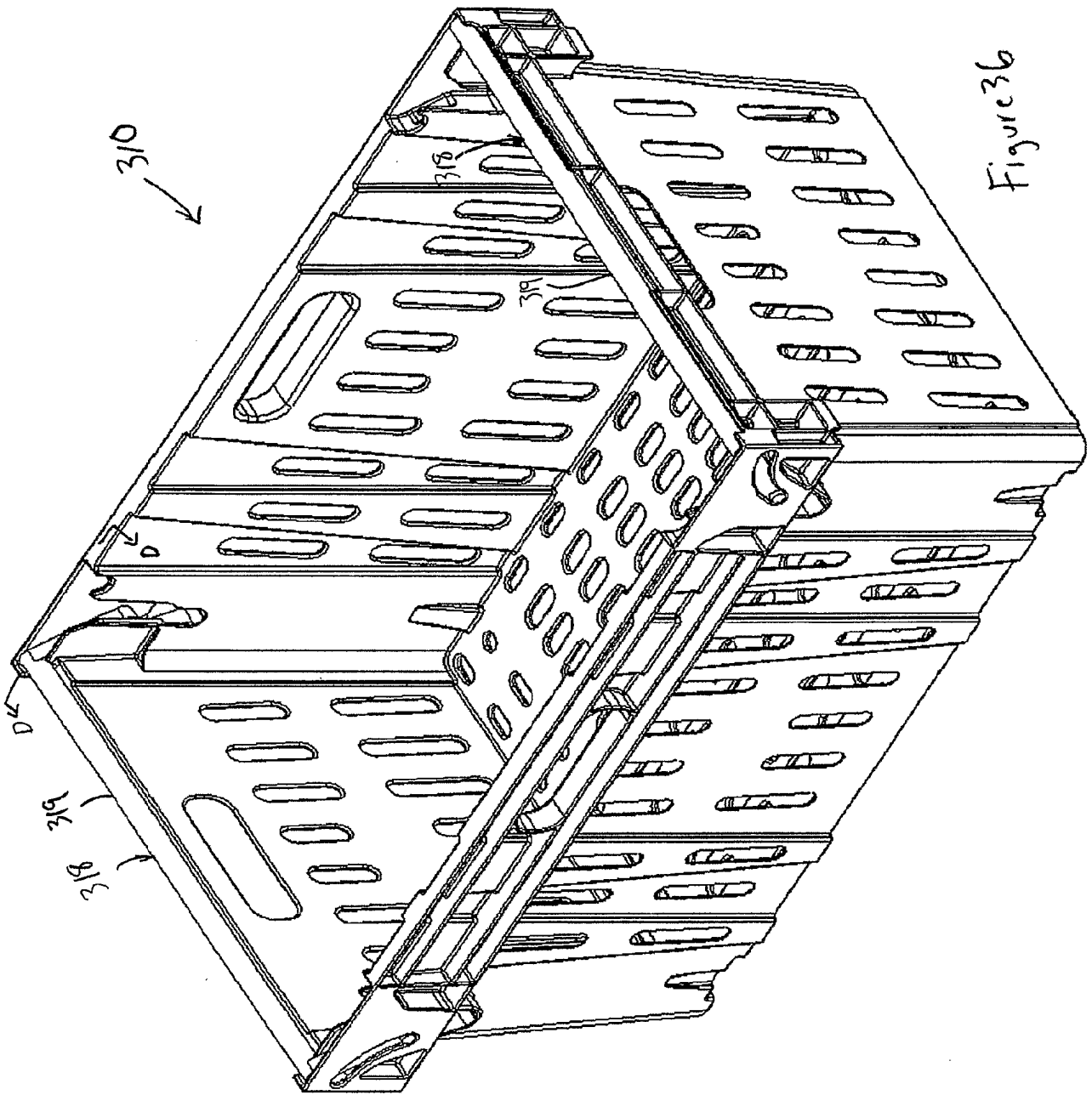
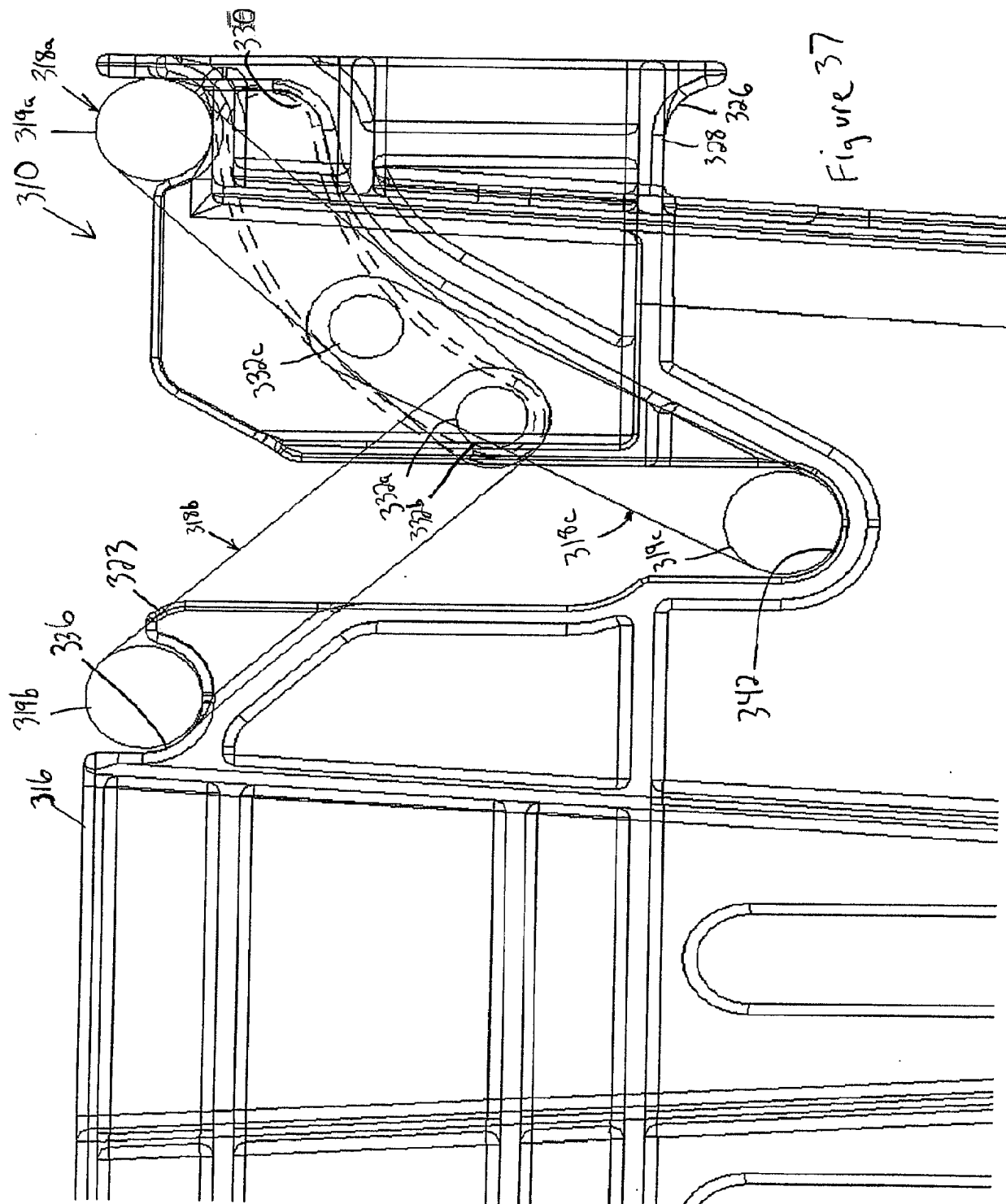


Figure 35





## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2005/018374

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 B65D21/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 374 859 A (* LINPAC MOULDINGS LIMITED) 30 October 2002 (2002-10-30) abstract; claims 1-3; figures 1-6	1-19
A	US 4 391 369 A (STAHL ET AL) 5 July 1983 (1983-07-05) column 2, line 33 - column 4, line 42; figures 1-7	1-19
A	EP 0 926 073 A (C G PAXTON LIMITED) 30 June 1999 (1999-06-30) paragraphs '0010! - '0021!; figures 1-4	1-19
A	US 5 772 033 A (LOFTUS ET AL) 30 June 1998 (1998-06-30) column 3, line 29 - column 7, line 23; figures 1,5-7	1-19
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

11 August 2005

Date of mailing of the international search report

24/08/2005

Name and mailing address of the ISA

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Cazacu, C



## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US2005/018374

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 124 588 A (* CRAYONNE LIMITED) 22 February 1984 (1984-02-22) column 1, lines 43-118; figure 3 -----	1-19

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2005/018374

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